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Alaska Pesticides Profile

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Project Officer:
Dianne Soderlund

INTRODUCTION

Overview/Historical Perspective

Historically, pesticide use in Alaska has not been considered significant and as such, interest in this program has been relatively low. The responsibility for regulation of pesticides in Alaska falls jointly to the Environmental Protection Agency and the Alaska Department of Environmental Conservation. Resources dedicated to the pesticide program in Alaska by both agencies have remained very static, with little change since the program was implemented nearly 10 years ago. Currently, the State has one staff position for pesticides and EPA has recently placed a position in Anchorage. This is indicative of the fact that resource agencies, regulators and the general populace are realizing the potential for, and possibility of, significant pesticide uses within the State.

In reality, the use of pesticides in the State of Alaska has increased as dramatically as the population over the last ten years. Five years ago there were approximately 20 pesticides frequently used in the State for pest control; now there are well over 100. Pesticide use occurs in a large array of Alaskan industries, including oil and gas exploration, seafood processing, aquaculture, forest management, and agriculture. There is significant additional use of pesticides by private and government users for everything from home gardening to large scale vegetation control programs. Currently, there are no pesticide manufacturers or formulators in the State, but there are individuals interested in these activities as a business venture.

Because of the vast and remote nature of the State, pesticide regulation and program development pose some unique problems. There are wide cultural variations in the State, and major differences between the lifestyles of rural and urban Alaskans, as well as those who follow more traditional native lifestyles. The issues become further complicated by the travel limitations in the State. With a very minimal road system, a large percentage of the State can only be accessed through small plane travel. All of these factors dictate that traditional pesticide regulation and training methods may be of limited value in the Alaska milieu, and more creative means of program implementation may be called for.

Public interest in pesticide use runs high in Alaska. Issuance of pesticide use permits by ADEC receives a great deal of scrutiny and often arises in well-attended public hearings. Although pesticide use in Alaska does not compare with that of many of the lower 48 states, the potential for increased use and the growth of Alaskan industries indicate the need for increased attention to this program.

Pesticide Profile Goals and Objectives

The intent of this pesticide profile is to provide an accurate and specific description of the current status of pesticide issues and uses in the State of Alaska. Consequently, this document attempts to quantify pesticide uses by asking who's applying them as well as determining types

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of substances used. Government, private and industrial pesticide users were identified and surveyed to achieve this goal.

Secondly, the profile provides a narrative description of the pesticide program and issues within the State. This includes a discussion of pesticide regulatory controls, environmental concerns, future needs. and an assessment of the current status of the program. Additionally, historical uses are discussed, where possible, to provide some feeling for pesticide use trends.

Profile Limitations

There are certain limitations with regard to the information and data presented in this profile which should be kept in mind during its review.

A great deal of the pesticide use information for this document was collected via mail survey letters. Unfortunately, in most instances time and resources did not allow either follow-up letters or telephone calls to initial non-respondents (although in many instances telephones are not available). Follow-up may have increased the response rate measurably, although the current data base is considered to be statistically valid. Along these same lines, it should be noted that certain "user groups" (i.e., timber, utility companies, military) had a much higher response rate than other groups. Naturally, the increased responses within a user group provide a stronger data base.

In some instances telephone survey methods were used in lieu of letters. One group, seafood processors, were surveyed during site visits by inspectors in the water program. This approach resulted in nearly a 100% response, although a smaller segment of the entire industry actually received requests for information. This approach was taken after a preliminary distribution of letters to certified applicators in the seafood industry received no response.

The survey information pertaining to wood preservative (penta, creosote, inorganic arsenicals) use in Alaska is minimal. It appears that the general population does not look upon wood preservatives as pesticides. As such, responses to initial pesticide letters did not reveal any wood preservative use. During subsequent mailings to user groups identified as potential wood preservative users, information on wood preservatives was specifically requested. Unfortunately, this still yielded a very small quantity of data. Lack of public knowledge in this area appears to have limited the quantity of data available.

Because of this, wood preservative use data may be one instance where the survey results do not reflect actual use conditions. This position is supported by conversations with numerous ADEC and Extension Service Staff throughout the state.

This profile was also limited somewhat by time and resources. Certain types of pesticide users such as hospitals, veterinarians, restaurants, and institutions were not surveyed for their pesticide uses. These facilities were considered likely to utilize primarily

disinfectants and cleaning solutions and these uses were not considered unique to Alaska. Use data from these facilities could probably be collected from anywhere in the United States and be applicable to Alaska facilities.

The profile also does not adequately address private use of pesticides, especially in the urban areas, unless individuals fit into one of the listed user group categories. Identifying private uses is a nationwide concern. In keeping with this, private pesticide use information is currently being collected in the Seattle King County area. This information could possibly be modified at a future date to reflect Alaskan urban pesticide uses.

Lastly, quantitative data was received in many different units. All data has been converted to gallons or pounds. Primarily, respondents reported quantities in terms of whole container weight or gallonage, but a handful of users did report use in terms of active ingredients. For purposes of estimation, all quantities were treated as whole weight.

Comparisons between the current survey and one completed by the Agricultural Experimental Station, University of Alaska (AES) in 1978 deserve mention here.

The AES study primarily surveyed pesticide dealers in the State, whereas the 1984 data is based on information from pesticide users in most instances. The AES survey results appear to represent primarily commercial pesticide uses, with a strong emphasis on agricultural and right of way pesticide uses. The EPA study focuses on user groups, which may or may not be commercially oriented.

Several important facts did come to light during the comparison of these reports. Perhaps the most interesting is that the 1978 survey reports a higher pesticide use figure than those extrapolated for the 1984 calendar year. Actual comparison of the numerical values and a discussion of the possible reasons for the differences can be found in the section covering Pesticide Use, Use Characteristics, Types and Quantities of Pesticide Use. Both reports clearly have strong points, with the 1978 report possibly providing more accurate information for the agricultural community and the 1984 data illustrating the versatility of pesticide uses in the State within different groups.

It could be suggested that actual pesticide use in the State would most clearly be represented by combining the two types of data collected from these reports. The 1984 user data indicates almost 50% of pesticides used in Alaska are mail ordered. A dealer survey would be next to impossible for these out of state distributors, especially considering the wide range of facilities involved. On the other hand, the dealer survey within the state provides a more comprehensive picture of the associated uses. The comparison of these two lends itself to the identification of certain trends discussed in those same Pesticide Use sections mentioned previously. However, it is important to keep in mind that the pesticide use data presented in this report should only be used as estimates of total applications in the State and do not represent absolute values.

PESTICIDE REGULATORY CONTROLS

Authority
Federal Statute and Regulations

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides for the protection of man and the environment from any adverse effects related to pesticides or their use. This is achieved by assuring that pesticides are produced in accordance with approved chemical formulations and applied according to registration and labeling requirements. FIFRA is one of the oldest Federal environmental laws in existence with its legislative beginnings found in 1947. The law in its current form was passed by Congress in 1972, with substantial amendments occurring in 1975 and 1978.

Congress mandated EPA to develop and promulgate implementation regulations to carry out the intent of FIFRA. These regulations can be found in 40 CFR Parts 150 to 189. FIFRA regulations address the registration, manufacture, transportation, and application of pesticides as well as training and certification specifications, criteria for establishment of tolerance levels, importation and exportation, worker safety, administrative procedures, enforcement, and penalties.

The title of FIFRA is somewhat misleading in that the law covers the use of all pesticides, which are defined in the Act as "Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest" and, secondarily, "any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant." Therefore, FIFRA regulates not only insecticides, fungicides, and rodenticides but also biocides, herbicides, wood preservatives, repellants, and many other substances.

FIFRA stipulates that EPA can enter into cooperative agreements with the states to further the law's goals by allowing the states primary responsibility for implementation of certain aspects of the Act. In the State of Alaska, the Department of Environmental Conservation was designated as lead agency for FIFRA responsibilities. These responsibilities include primary administration of the pesticide applicator training and certification program under Section 4 of FIFRA, and primary enforcement authority for any misuse or illegal sale of pesticide products within the state under Section 23(a)(1) of FIFRA. These issues will be addressed in more detail in the State and Federal Roles segment of the discussion of Program Implementation.

Authority
State Statute and Regulations

The statutory authority for the Department of Environmental Conservation (ADEC) to implement pesticide controls in the State of Alaska is found in Title 46.03.020. In this section the ADEC is granted the power to control pesticides use within the State of Alaska. Section 46.03.070 provides that "No person may spray or apply, or cause to be sprayed or applied, DDT, dieldrin or other pesticide or broadcast chemical in a manner which may cause damage to or endanger the health, welfare or property of another person, or in such a manner as to be

likely to pollute the air, soil or water of the state without prior authorization of the department." Section 46.03.330 further provides that State or local entities conducting pesticide application as a public project or in public lands must obtain a permit from ADEC, which involves a public hearing and public comment period.

Implementing regulations for the pesticide statute are found in Title 18, Chapter 90, Sections 10-60. These sections address: Certification required for the purchase or use of restricted use pesticides; required records maintenance; exemptions; prohibitions; required insurance; permits required for pesticides projects; and definitions.

Categories of certification and the specifics of the certification exam for the purchase and use of pesticides are found in the Alaska Pesticide Control Plan. Currently there are 12 certification categories.

One aspect of the program which is of significant interest in Alaska is the special local need registration program, as provided under section 24(c) of FIFRA. This section allows for a state to register a pesticide product for uses beyond the Federal registration as long as that registration has not been previously denied, disapproved or cancelled by the EPA, and the product is only distributed within the state.

Establishment of this program in Alaska is perceived to be critical by the private and public sector due to the unique climatic nature of the State and therefore its special pesticide needs.

Current State of Alaska pesticide regulations do not mention or provide any guidelines regarding the issuance of a special local need permit, which is allowed under section 24(c) of FIFRA. However, the Alaska Department of Environmental Conservation staff do have in-house procedures which have been developed to deal with 24(c) requests. These are as follows:

1. Requests for a 24(c) registration will only be accepted from an established organization which, in the judgement of the Department, would most likely be capable of complying with the 24(c) requirements. Farmers are discouraged from applying.
2. Initially, the 24(c) proposal is submitted by the applicant to the Pesticide Specialist. The Pesticide Specialist then puts a package together and submits it to the University of Alaska, which in turn provides the proposal to the Agricultural Experiment Station. Three professors are then chosen to review the proposal. Normally, if there is not unanimous agreement that the 24(c) should be granted, the proposal is turned down. If the University staff recommend granting the 24(c), ADEC staff are notified and the necessary revisions are made to the proposal in response to the comments received.
3. The Pesticide Specialist will then recommend approval or denial of the project. If he recommends approval the proposal is submitted to the Commissioner of ADEC for a final decision. If the proposal is denied, the

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applicant may appeal the decision, as allowed in 18 AAC 73. To date this has never been done.

4. Before final approval is given the applicant must provide a letter from the formulator or manufacturer stating that they approve of the proposed pesticide use and will cooperate on any labeling requirements. The applicant must also provide a professionally made State label, preferably printed on colored paper.
5. The applicant can begin utilizing the pesticide concurrently with the 90 day EPA review of the State decision. This realistically allows for use of the pesticide for a full Alaskan growing season prior to EPA making a decision on the proposal.

To date, ADEC has processed four requests for 24(c) Special Local Need permits. Of these, none have been granted through the 24(c) process. One has been approved through the IR-4 program. ADEC staff concur that it would be beneficial in some respects to have guidelines and/or regulations covering the state 24(c) process. By the same token, there are administrative drawbacks that stem from the current low level of resources dedicated to the ADEC program which would likely have to be resolved.

Authority

Local Regulations

Of the major cities in Alaska, i.e. Anchorage, Fairbanks, Juneau, and Valdez, only Anchorage currently has any type of local regulations pertaining to pesticide use within the municipal boundaries. Other communities rely upon the State regulations promulgated and implemented by ADEC.

The Anchorage Municipal Code 15.75.010-070 requires that a permit be obtained for commercial pesticide applications within the Municipality. In Anchorage there has been a move, initiated by concerned citizens, to revise the municipal code and place additional restrictions on spraying of pesticides by commercial applicators. The Municipal Assembly returned a proposal which restricted all tree spraying to a height six feet back to the Health Department for additional review in the spring of 1985. A local ad hoc committee was formed, public meetings were held, and a second proposal is expected to go before the Assembly prior to the 1986 spraying season. Alternate controls which are being considered include prior notification to neighbors that spraying will occur, no spraying on property adjacent to that of objectors of spraying, spraying only during low wind conditions, spraying only during early morning hours, and increased enforcement. In all likelihood, the final recommendation will be a combination of these options.

In other Alaskan municipalities, the local sanitarians do keep track of pesticide applicators and ensure that they comply with state requirements. Reportedly, there are only two companies which do business in Fairbanks and one that serves the other communities mentioned. Anchorage has nine commercial applicators doing business within the Municipality.

Program Implementation

State and Federal Roles

As discussed earlier, certain aspects of pesticide regulations under FIFRA have been delegated to the State Department of Environmental Conservation (ADEC). Alaska is different in this regard in that the pesticide program is handled by the State environmental regulatory agency rather than the Division of Agriculture, as is the case in most other states. Program delegation for training and certification was completed July 8, 1977 after submittal and approval of the Alaska Pesticide Control Plan by ADEC, as allowed under section 4(a)(2) of FIFRA. The EPA provides a $15,500 grant annually to ADEC for the training and certification program. Grant monies provided to a state by EPA are provided on a two tier basis. A base funding level is provided to practically every state. In addition, a formula is applied to the funds which remain after the base amounts have been allocated and these are then distributed to the states per appropriate criteria. This formula takes into consideration the estimated number of farms per state, the number of certified private applicators, and the number of certified commercial applicators. The base funding for training and certification grants has remained at $15,000 for a number of years. Because Alaska is small in terms of farming and certifications relative to lower 48 states, only $500 in additional "formula" funds are granted to ADEC. In Region 10, the largest training and certification grant goes to the state of Oregon in the amount of $22,700. This illustrates that even in a state with major agricultural activities, the amount of funds provided does not increase dramatically. The intent of these grant monies is to provide each state with a portion of the funds needed for a training and certification program, rather than to fund the entire program.

Section 4(a) of FIFRA requires that users of restricted use pesticides be certified. The ADEC has the lead role for training of non-agricultural commercial applicators and applicators of restricted use pesticides. ADEC works closely with the Cooperative Extension Service in the training of private pesticide applicators. However, due to resource cutbacks within the Extension Service, this specific role has diminished somewhat in the last several years. [Their historical and current roles are discussed more fully in the next section of this report.]

The State certifies pesticide applicators of restricted use pesticides in twelve categories. The training sessions administered by the State are followed, usually on the same day, by a certification exam. Currently, if students have been attentive during the training course, they are guaranteed certification for their user group. Training courses are provided to specific user groups, which is somewhat different than administration of the program in other states. The training and certification program in Alaska has several unique characteristics which are due in part to the vastness of the State and the many remote locations where there is potential for pesticide use.

Currently, the State training and certification program provides training to the pesticide user groups "on location", as opposed to requiring the users to attend annual certification classes in major cities, as is the case with the lower 48 states. This approach in itself creates significant logistical and economic problems. The training program may provide general information on pesticide law and legal authorities, reading of the label, proper

handling, storage, and disposal methods and some pesticide application information specific to the group's interest and the certification categories. The training usually occurs in the morning and the exam is administered in the afternoon. The exception to this is aerial applicators, who have a two day training session. Follow-up sessions will be provided upon request.

Beside the ADEC and Extension Service, other agencies administer smaller scale training programs which deserve mention. The U.S. Forest Service administers its own applicator certification and training program in Alaska. The State Division of Forestry is anticipating increased herbicide use in the upcoming years. As a result of this, the Agency is looking for any training opportunities that exist and may develop some materials of their own. This Agency recently sponsored a representative from Monsanto, manufacturer of Roundup, to come discuss the chemical with foresters as well as private citizens. This program will likely be expanded.

At the time of program delegation, ADEC was also given responsibility for certain aspects of pesticide enforcement within the State, as allowed under section 23(a)(1) of FIFRA. A Cooperative Enforcement Agreement was developed and entered into by ADEC and EPA. This agreement, which is reviewed and updated on an annual basis, delineates pesticide enforcement authorities and responsibilities between the two agencies to ensure adequate response to pesticide incidents while minimizing duplication of enforcement efforts.

Alaska State statutes provide ADEC with the authority to complete inspections (use/misuse for agricultural and non-agricultural activities, pesticide producing establishments, imports, marketplace, and incidents), monitor experimental use permits, monitor the State certification program, and complete sample collection and analysis. The ADEC commits to completing a specified number of investigations and other pesticide enforcement related activities in the Cooperative Enforcement Agreement annually. Under the Agreement, ADEC maintains primary enforcement authority over use/misuse pesticide violations in addition to performing the monitoring and surveillance functions necessary to assure compliance with the State pesticide laws. EPA retains primary enforcement authority for product/formulation violations, including but not limited to non-registration and misbranding violations. However, under the Agreement ADEC staff is responsible for all case preparation. In instances where evidence reveals violation of the State and Federal laws, the presumption is that the State will pursue the appropriate enforcement action under State law. Alternatively, the State may opt to refer the case to EPA for action. In instances where the activity is a violation of only Federal law, the evidence will be forwarded to EPA for possible initiation of a civil or criminal enforcement action. EPA may also initiate enforcement action in situations where EPA determines an action taken by the State is not appropriate.

EPA provides analytical support for formulation samples collected by the State to ensure product integrity or as support for other enforcement actions. Compliance with EPA specified sample collection, analytical procedures, and protocol is required for all potential enforcement cases.

Currently, ADEC does not receive Federal grant monies for administration of pesticide enforcement activities. Funding for the State program would be approximately $75,000 annually.

The State of Alaska does not currently have a pesticide registration program. Therefore, pesticides sold in the State require only Federal registration. EPA continues to issue Federal experimental use permits for certain activities in Alaska. In conclusion, EPA retains an oversight role with regard to some enforcement activities and the training and certification program. In other aspects of pesticides activities and issues EPA retains primary responsibility in Alaska.

Program Implementation

Cooperative Extension Service Roles

The Cooperative Extension Service plays a major role in pesticide education throughout the United States, including Alaska. Through its extension agents and offices and the Master Gardener and Pest Scout programs, the Extension Service disseminates a great deal of information on pests and pesticides. Additionally, extension offices are responsible for distributing information on pesticides and other agricultural news as it is generated by the USDA and University Agricultural Experiment Stations.

The Pesticide Coordinator for the Extension Service is located in Anchorage. Extension agents are located in thirteen communities throughout Alaska. As each of the agents in these communities was contacted for this profile, it became obvious that they had extensive knowledge of thier community's pesticide problems and needs. Much of the information presented in the section of this report entitled "Private Pesticide Uses", is derived from discussions with extension agents.

Historically, the Agency has played a significant role in the training and certification of private pesticide applicators in the State. In the original Alaska Pesticide Control Plan, the Extension Service was obligated to train all private applicators and commercial applicators in the agricultural category. The State Cooperative Extension Service in Alaska receives approximately $10,500 annually from EPA through the United States Department of Agriculture (USDA) to assist in the administration of this program. The process and criteria which USDA utilizes to distribute grant funds is very similiar to that used by EPA for direct funding to the state agencies for training and certification. The base grant amount for Extension offices is $10,000.

Training sessions were often conducted by Agency and Extension staff jointly, with extension personnel providing training and ADEC personnel administering the certification exams.

In the past several years, the frequency of these joint training sessions has diminished to almost none due to resource cuts within the Extension Service. However, the Extension Service is still involved in training private applicators and has reached an agreement with ADEC that the Extension Service will administer the certification exams for private applicators. This will eliminate the need for ADEC staff to be present at each training session. However, ADEC will continue to issue formal certifications. [The Extension Service has put EPA and ADEC on notice that it does not

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have adequate resources to train private applicators in the use of wood preservatives, when these substances become restricted use pesticides.]

Program Implementation

U.S. Customs Service Roles - Pesticide Imports

There are ten Ports of Entry into the State of Alaska and five Customs stations, all administered by the U.S. Customs Service. The Ports of Entry are located in Ketchikan, Wrangell, Juneau, Sitka, Skagway, Dalton Cache (42 miles from Haines), Port of Alcan (on the highway), Valdez, Fairbanks, and Anchorage. Commercial shipments of goods can only arrive through one of the ten Ports of Entry. The U.S. Customs Service is responsible for regulating importation of all commercial and private goods into the United States.

Customs agents in all 10 Ports of Entry were contacted to determine the extent and quantities of pesticides imported into Alaska. Their response was somewhat surprising in that all of the agents reported no pesticide entries during the 1984 and most could not remember any coming through during their tenure at the various stations, which extended up to 9 years.

The areas most likely to receive imported pesticides were identified as those with the ability to receive Japanese or Canadian goods. Importation of Japanese pesticides for use in the fishing industry and importation of Canadian products for use in agriculture were initially identified as major concerns. However, according to information supplied by Customs agents in Seward and the Port of Alcan, this type of commercial importation problem has not developed to date. According to currently available information, only one shipment of Canadian-labeled pesticide was ever detained at the Port of Alcan--and that was several years ago. This shipment was never allowed into Alaska by U.S. Customs since the product was not labeled for use in the United States. No such incident record exists for seafood pesticide products. Canadian goods enter via truck down the Taylor Highway while Japanese or other Pacific Rim Countries ship via seagoing vessel. The only other means of importation is air transportation.

According to Customs personnel, all types of commercial shipments, including mail order goods, are very closely scrutinized, especially when the shipments are being checked for other Federal agencies (as is the case with pesticides and EPA). The commercial shipments must comply with all import restrictions and Federal laws. To ensure compliance a bond must be posted. However, non-commercial shippers are not required to make formal entry into the United States. Consequently, pesticide importation which occurs under these circumstances would be scrutinized much less than the commercial counterpart. With regard to Canadian label

pesticides, it is very likely that the most common mode of entry into Alaska would be via private carrier. Northern Alaskan, i.e. Delta, agriculture is in many ways linked much closer to Canada than to the contiguous United States. It is not uncommon for farmers to travel to Canada to pick up supplies which could include pesticides. This scenario becomes even more plausible when one considers that the Canadians register several pesticide products for agricultural use which are not registered in the U.S. but which are considered desirable for the northern climate i.e., Treflan, VitaVax. According to Customs personnel, there is a strong likelihood that this type of small scale importation (i.e., pick-up truck load) would travel through customs without notice. The same type of situation may exist with regard to seafood processing. As joint ventures between foreign and domestic processors increase, the potential for use of a non-registered pesticide also increases. However, the survey of pesticides use does not indicate this situation currently exists.

Customs check points are an important regulatory control to prevent importation and use of unregistered pesticides in the United States. The effectiveness of this control depends in large part on the knowledge and experience of the individual Customs officer. Customs officers were generally aware of the pesticide registration and labeling requirements under FIFRA. When asked what they would do upon discovering a pesticide shipment, the common answer was to contact either the Anchorage or Portland Customs office for guidance. Agents also receive a Cargo Criteria File Listing from the Pesticides Import Specialist in Portland which flags an import needing EPA attention. If an import is suspected of being a pesticide, Customs will detain the shipment and require that a Notice of Arrival of Pesticides and Devices, EPA Form number 3540-1, be completed by the importer. This form is then sent to EPA along with a current copy of the product label to determine if 1) the product is a pesticide, and 2) whether it is properly registered for use in the United States. If the answer to both questions is yes, EPA notifies customs that it is acceptable to release the shipment.

Customs agents appeared to have adequate resources at their disposal to deal with an identified pesticide. However, in discussing what types of substances are considered pesticides, it became apparent that additional definition needs to be provided. When discussing pesticides, most agents confirmed that they do not think of substances such as disinfectants and wood preservatives as pesticides. It seems appropriate to prepare and distribute a list of the types of materials considered pesticides to the U.S. Customs Service for dissemination to their personnel. This may assist the agents in identifying pesticides and preventing illegal imports.

PESTICIDE USE

Use Characteristics

Types and Quantities of Pesticide Use

In reviewing both the number of reported uses and the total quantities of pesticides applied in Alaska, it becomes apparent there are certain substances which are more prevalently used than others in the State. Additionally, in some instances these uses can be identified by industry. The following is a short summary of the more prevalent use trends. For a specific industry by industry discussion, please refer to the section of this report entitled User Groups.

The total amount of pesticide reported to have been used in the State in 1984 was approximately 51,185 pounds and 62,171 gallons. These values compare very closely with the reported quantities purchased during the same time period.

The most commonly used herbicide in agriculture is 2,4-D. Comparatively, glyphosate is the most commonly used pesticide for overall vegetation control and is more often used in smaller quantities for non-commercial purposes. Premerge is commonly used as a pre-emergent herbicide by both commercial and private farmers. Malathion and pyrethrins are used in relatively large quantities by a wide range of users for mosquito control. Diazinon is by far the most commonly used garden insecticide, by both private and commercial applicators.

The most prevalently used pesticides in the seafood industry are disinfectants, including chlorine and iodine compounds. In fish hatchery operations, formaldehyde and iodine compounds are used almost exclusively.

The military uses a wide variety of pesticides, with the largest quantities being 2,4-D for dandelion control. Insecticides such as Baygon, Boric Acid, and Chloropyrifos are used to control cockroaches and other insects.

The majority of other industries use relatively little pesticide.

Estimated quantities of total pesticide use in the State were derived using standard statistical methodology. Copies of this analysis will be provided upon request. Due to the manner in which this information was provided to EPA, pesticides use data is expressed in either gallons or pounds. These values should be added together to reflect total pesticide use. Pesticide types were divided into seven categories, and total estimated uses were determined for these groups, as shown in the following table:

Group	Gallons	Pounds
Fungicides	4,100	240
Wood Preservatives	------	500
Disinfectants	27,400	47,500
Biocides (Oil Industry)	59,600	------
Rodenticides	------	480
Insecticides	7,300	3,800
Herbicides	7,000	58,000

Description of Tables

The first two tables provided in the following section illustrate total reported pesticide use in gallons and pounds. Subsequent tables illustrate pesticide use by industry, where adequate date was provided. Tables are not provided for the Golf Course, Millworking and Herd Maintenance groups due to a general lack of reported use. Additionally, no table is provided for the section entitled Pesticide Availability in Alaskan Communities, as this is strictly narrative in nature.

Each line entry on a table represents an individual reported use. Where a common name appears once and numerous listings appear under the trade name column, the substances all share the same common name and are categorized together.

GALLONS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
	Super-Cidol	18.0 gal.	18.0 gal.
	Vaposector	6.0 gal.	6.0 gal.
2-(1 Methyletnoxy)phenol methylcarbamate	Precor residual fogger	0.1 gal.	0.05 gal.
2,4-D	2,4-D	83.75 gal.	83.75 gal.
	2,4-D	112.5 gal.	112.5 gal.
	2,4-D	26.38 gal.	26.38 gal.
	2,4-D	75.0 gal.	75.0 gal.
	2,4-D	125.0 gal.	125.0 gal.
	2,4-D	0.725 gal.	0.725 gal.
	2,4-D	100.0 gal.	100.0 gal.
	2,4-D	200.0 gal.	200.0 gal.
	2,4-D Amine	0.25 gal.	0.25 gal.
	2,4-D Clover and Chickweed killer	0.125 gal.	0.0 gal.
	2,4-D Eml.	100.0 gal.	100.0 gal.
	2,4-D Eml.	198.0 gal	198.0 gal.
	Amine 4	12.0 gal.	7.0 gal.
	Cenex	10.0 gal.	10.0 gal.
	Cenex 40A Weed Killer	245.0 gal.	245.0 gal
	Lilly Miller Dandelion Killer	1.25 gal.	1.25 gal.
Amine 40	Amine 40	1000 gal. sold	1000 gal. sold
Argentyne	Argentyne	174.0 gal.	174.0 gal.
	Argentyne	55.0 gal.	55.0 gal.
Avenge	Avenge	25.0 gal.	25.0 gal.
Bacillus Thuringensis var. Isralensis	Teknar BTI	15.0 gal.	15.0 gal.
Banvel	Banvel	0.78 gal.	0.78 gal.
Baygon	Baygon (Liquid)	31.0 gal.	31.0 gal.
	Baygon 1.5	3.0 gal.	3.0 gal.
	Baygon Eml.	129.3 gal.	129.3 gal.
Benomyl	Benlate	.28 gal.	.28 gal.
	Dexol Benlate	.012 gal.	.012 gal.
Betadine	Betadine	140.0 gal.	140.0 gal.
	Betadine	1.0 gal.	1.0 gal.
BP-300	BP-300	4.0 gal.	4.0 gal.
Break-up	Break-up	30.0 gal.	30.0 gal.
Bromoxynil	Bromoxynil	0.125 gal.	0.125 gal.
	Buctine	10.0 gal	10.0 gal
	Buctril	12.5 gal.	12.5 gal.
	Buctril	4.4 gal.	4.4 gal.
Carbaryl	Sevin	0.5 gal.	0.25 gal.
Carboxin Thiram	Vitavax 200	55.0 gal	55.0 gal
Chemprocide	Chemprocide	110.0 gal.	110.0 gal.
Chlordane	Chlordane	1.0 gal.	1.0 gal.
Chlorine	Sodium Hypochlorite	12.0 gal.	12.0 gal.
Chlorpyrifos	Chlorpyrifos Eml.	281.5 gal.	281.5 gal.
	Dursban	3.0 gal.	3.0 gal.
	Dursban	2.3 gal.	2.3 gal.
	Dursban 2E Eml.	429.5 gal.	429.5 gal.
	Dursban 4E	1.5 gal.	1.5 gal.
	Dursban Eml.	22.4 gal.	22.4 gal.
	Dursban-M	3.0 gal.	3.0 gal.
	Lorsban	2.0 gal.	2.0 gal.
	Lorsban	5.0 gal	5.0 gal.
Chlorsulfuron	Glean	0.12 gal.	0.12 gal.
	Glean	1.0 gal.	1.0 gal.
	Glean	1.54 gal.	1.54 gal.

*Data in these tables is presented as it was reported to EPA.

GALLONS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
Constrict	Constrict	5.0 gal.	5.0 gal.
Creosote	Atco	100.0 gals.	100.0 gals
Cygon	Cygon	1.0 gal.	1.0 gal.
Cygon 2-E	Cygon 2-E	.01 gals.	.01 gals.
	Pratt	.25 gal.	.125 gal.
D-TOX 4E	D-TOX 4 E	9.0 gal.	9.0 gal.
Dexol	Systemic House Plant Insecticide	.06 gal.	.06 gal.
Di-Syston	Cole's Systemic House Plant Insecticide	.06 gal.	.06 gal.
	Dexol Systemic House Plant Insecticide	.06 gal.	.06 gal.
Diazinon		.25 gal.	.25 gal.
	AG-500	10.0 gals.	10.0 gals.
	Diazinon	1.0 gal.	1.0 gal.
	Diazinon	0.5 gal.	0.5 gal.
	Diazinon	2.0 gal.	2.0 gal.
	Diazinon	19.0 gals.	19.0 gals.
	Diazinon	.125 gal.	.125 gal.
	Diazinon	0.125 gal.	0.05 gal.
	Diazinon	0.25 gal.	0.25 gal.
	Diazinon	0.25 gal.	0.25 gal.
	Diazinon	0.125 gal.	0.125 gal.
	Diazinon	0.125 gal.	0.125 gal.
	Diazinon	0.06 gal.	0.02 gal.
	Diazinon	4.0 gal.	4.0 gal.
	Diazinon 4E	2.0 gal.	2.0 gal.
	Diazinon 4E	4.0 gal	4.0 gal
	Diazinon Eml.	478.5 gal.	478.5 gal.
	Diazinon Powder	30.0 gal.	30.0 gal.
	Diethyl Phosphorotsote	1.0 gal	1.0 gal.
	Namco	1.0 gal.	1.0 gal.
	Ortho Diazinon liquid	0.5 gal.	0.5 gal.
	Ortho Fruit and Vegetable Insect Control	0.125 gal.	0.125 gal.
Dicamba	Banvel	5.0 gal	5.0 gal
Dicambia	Dicambia	0.125 gal.	0.125 gal.
Dichlorvos	Dichlorvos	633.9 gal.	633.9 gal.
Dimethylphosphorothiozte	Metasystox R2	23.0 gals.	23.0 gals.
Dinoseb	Premerge	18.7 gal.	18.7 gal.
	Premerge	0.125 gal.	0.125 gal.
	Premerge	1.0 gal.	1.0 gal.
	Premerge	35.0 gal.	35.0 gal.
	Premerge	15.0 gal	15.0 gal
	Premerge	60.0 gal.	60.0 gal.
	Premerge	40.0 gal.	40.0 gal.
	Premerge	0.25 gal.	0.25 gal.
	Premerge	25.0 gal.	25.0 gal.
	Premerge	5.0 gal.	5.0 gal.
	Premerge/Di-Nitro Weed Killer	30.0 gal.	30.0 gal.
Diphenamid	Diphenamid	0.125 gal.	0.125 gal.
Ethazol	*dexol Trueban	0.03 gal.	0.03 gal.
	Science Trueban	0.07 gal.	0.07 gal.
Fenocil	Fenocil non-selective weed killer	110.0 gal	110.0 gal
Fluazifop-butyl	Fusillade	1.0 gal	1.0 gal
Fogger	Fogger	2.5 gal.	2.5 gal.
Formalin	Formaladehyde	5.0 gal.	55.0 gal.
	Formaldehyde	3.0 gal.	3.0 gal.
	Formaldehyde	1703.0 gal.	1703.0 gal.

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GALLONS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
	Formaldehyde	20.0 gal	20.0 gal.
	Formaldehyde	30.4 gal.	30.4 gal.
	Formaldehyde	5.0 gal.	5.0 gal.
Glutaraldehyde	OFC B-649	1300.0 gal.	1300.0 gal.
Glyphosate	Roundup	6.0 gal.	6.0 gal.
	Roundup	1.0 gal.	1.0 gal.
	Roundup	0.25 gal.	0.25 gal.
	Roundup	5.0 gal.	
	Roundup	2.0 gal.	2.0 gal.
	Roundup	30.0 gal	30.0 gal
	Roundup	15.0 gal.	15.0 gal.
	Roundup	2.0 gal.	0.0 gal.
	Roundup	0.25 gal.	0.125 gal.
	Roundup	0.25 gal.	0.06 gal.
	Roundup	3.0 gal	3.0 gal.
	Roundup	0.25 gal.	0.25 gal.
	Roundup	0.125 gal.	0.125 gal.
	Roundup	2.0 gal.	2.0 gal.
Iocide	Iocide	55.0 gal.	55.0 gal.
	Iocide	55.0 gal.	55.0 gal.
	Iocide	100.0 gal.	100.0 gal
	Iocide	312.0 gal.	312.0 gal.
Iodine Disinfectant	Argentyne	50.0 gal.	50.0 gal.
Iodophor	Argentyne	18.0 gal.	18.0 gal.
IPC	Chemttoe	5.0 gal	5.0 gal
Isotox	Isotox	0.125 gal.	0.125 gal.
Kelthane	Kelthane	0.05 gal.	0.05 gal.
Kleenup	Kleenup	0.25 gal.	0.25 gal.
Knockout	Knockout	276.0 gal.	276.0 gal.
	Lilly Knockout	0.5 gal.	0.5 gal.
KXL	Agro	0.25 gal.	0.125 gal.
Lawn Weed Killer A	Lawn Weed Killer A	1.5 gal.	1.5 gal.
Lindane	Isotox	4.0 gals.	4.0 gals.
Lindane-isotox	Lindane	14.0 gal	14.0 gal
Malathion	Cythion	100.0 gal.	100.0 gal.
	Cythion Naled	.06 gal.	.06 gal.
	Dowl Malathion	6.0 gal.	6.0 gal.
	Malathion	16.0 gal.	16.0 gal.
	Malathion	1.0 gal.	1.0 gal.
	Malathion	20.0 gal.	20.0 gal.
	Malathion	19.0 gals.	19.0 gals.
	Malathion	1.0 gal.	1.0 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion	34.0 gal.	34.0 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion	0.125 gal.	0.025 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion	0.25 gal.	0.25 gal.
	Malathion	1.0 gal.	1.0 gal.
	Malathion	0.25 gal.	0.25 gal.
	Malathion	0.06 gal.	0.06 gal.
	Malathion 50	0.25 gal.	0.25 gal.
	Malathion Eml.	663.5 gal.	663.5 gal.
	Ortho	0.06 gal.	0.06 gal.
	Ortho	0.25 gal.	0.125 gal.
Malathion 95%	Cythion	10.0 gal.	1.0 gal.
Marine Woodlife	Marine Woodlife	20.0 gals.	20.0 gals.
MCPP	Chipco Turf	15.0 gal	15.0 gal
MCPS	MCPS	0.125 gal.	0.125 gal.
Metaldehyde	Deadline	0.125 gal.	0.125 gal.
Metasystox-R	Metasystox-R	12.0 gal	12.0 gal

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GALLONS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
Metasystox-R2	Metasystox-R2	6.0 gal.	6.0 gal.
Methyl Bromide	Methyl Bromide	2.5 gal.	2.5 gal.
Methoxychlor	Methoxychlor	0.05 gal.	0.02 gal.
Nicotine Fumigant	Nicotine Fumigant	1.5 gal..	0.75 gal.
Orthene		0.5 gal.	0.5 gal
	Ortho	0.25 gal.	0.125 gal.
Ortho Rose Food & Systemic	Ortho Rose Food & Systemic	3.5 gal.	3.5 gal.
OSP Amine	Diathylamine/ Dichlorophenoxyoeetic	5.0 gal.	0.0 gal.
Parathion	Del Parathion	2.0 gal	2.0 gal
Pramitol 25E	Propazine	31.0 gal.	14.0 gal.
Prometon	Prometon Eml.	550.0 gal.	550.0 gal.
Pyrenone	Pyrenone	138.0 gal.	138.0 gal.
Pyrethrin	Ortho Rose and Flower Killer	0.19 gal.	0.19 gal.
	Pyrenone	140.0 gal.	110.0 gal
	Pyrethrin	6.7 gal.	6.7 gal.
	Pyrethrin	30.0 gal.	30.0 gal.
	Pyrethrin Eml.	122.0 gal.	122.0 gal.
	Whitmire and Johnson's Bait	3.7 gal.	3.7 gal.
REPCO-TOX	REPCO-TOX	105.0 GAL.	105.0 GAL.
Resmethrin	Resmethrin	4.7 gal.	4.7 gal.
	Resmethrin	0.56 gal.	0.56 gal.
T-60-5X	T-60-5x	275.0 gal.	275.0 gal
Terraclor	Terraclor	90.0 gal.	90.0 gal.
	Terraclor	30.0 gal.	30.0 gal.
Tree Killer	Silvigar 510	0.25 gal.	0.25 gal.
Trithion	Dowl Trithion	1.5 gal	1.5 gal
Vapam	Vapam	5.0 gal.	5.0 gal.
Visco	Visco	43,305.0 gal.	43,305.0 gal.
White Fly Spray	White Fly Spray	0.06 gal.	0.06 gal.
Woodlife II	Woodlife II	20.0 gals.	20.0 gals.
Woodlife Wood Preservative	Roberts	20.0 gal.	20.0 gal.
X-CIDE	X-CIDE	5000.0 gal.	5000.0 gal.
Zep	Zep Eml.	1800.0 gal.	1800.0 gal.
Zep Formula 50	Zep Formula 50	165.0 gal.	165.0 gal.
Zep Stop		0.4 gal..	0.4 gal.
	Zep	3.12 gal.	3.12 gal.

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POUNDS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
Agrimycin	Agrimycin	1.0 lb.	1.0 lb.
Amizol	Amizol	537.0 lb.	537.0 lb.
Ammate - XNI	Ammate - XNI	14,000.0 lbs.	14,000.0 lbs.
Bait Blocks	B & G	30.0 lbs.	30.0 lbs.
Banvel XP	Velsicol	1150.0 lbs.	1150.0 lbs.
Baygon	Baygon (Bait)	20.0 lbs.	20.0 lbs.
	Baygon Bait	40.5 lb.	40.5 lb.
Baygon/Vapona	Baygon/Vapona	14.0 lbs.	14.0 lbs.
Bayleton 25W	Bayleton 25W	2.0 lbs.	2.0 lbs.
Benomyl	Benlate	2.0 lb.	2.0 lb.
	Benlate	10.0 lb.	10.0 lb.
	Benlate 50 WP	14.0 lb.	14.0 lb.
Boric Acid	Boric Acid	614.0 lb.	614.0 lb.
	Boric Acid dust	200.0 lb.	200.0 lb.
	Boric Acid PT-240	25.0 lbs.	25.0 lbs.
Bromacil/Diuron	Krovar I	500.0 lb.	500.0 lb.
Bromoxynil	Buctril	0.25 lb.	0.25 lb.
Captan	Captan	10.0 lb.	10.0 lb.
	Captan 50 WP	3.0 lb.	3.0 lb.
	Captan Fungicide Powder	1.0 lb	0.2 lb.
Carbaryl	Sevin 5%	1.0 lb.	4.0 oz.
Chlorine	Bottled chlorine	1035.0 lb	1035.0 lb.
	Calcium Hypochloride	100.0 lb.	50.0 lb.
	Gaseous Chlorine	300.0 lb.	300.0 lb.
	HTH	10.0 lb	10.0 lb.
	HTH Chlorine	400.0 lb.	400.0 lb.
Chloroban	Dursban	3.0 lb.	3.0 lb.
Chlorothalonil	Daconil 2787	3.0 lb. ai	3.0 lb. ai
Chloroxuion	Chloroxuion	0.5 lb.	0.5 lb.
Chlorpyrifos	Dursban/Chlorban	1.0 lb.	1.0 lb.
	Lorsban	0.25 lb.	0.25 lb.
Chlorsulfuron	Glean	0.1 lb. ai	0.1 lb. ai.
	Glean	1.0 lb	1.0 lb
	Glean	27.0 lb.	25.0 lb
Copper Sulfate	Copper Sulfate	2.0 lb.	2.0 lb.
Curry's Slug & Snail Bait	Curry's Slug & Snail Bait	2.0 lb.	2.0 lb.
Cycloprpoane carboxylate	Amway Bug Spray	2.0 lbs.	2.0 lbs.
D-Con	D-Con	3.0 lb.	3.0 lb.
D-Phenothrin	D-Phenothrin Aer.	84.5 lb.	84.5 lb.
D-Plus	D-Plus Dust	42.0 lb.	42.0 lb.
D-Sect	D-Sect Aer.	130.0 lb.	130.0 lb.
DCPA	Dacthal	0.5 lb.	0.5 lb.
Dexol	Dexol Systemic	1.0 lb.	1.0 lb.
Diazinon	Diazinon	1.0 lb.	1.0 lb.
	Diazinon	2.0 lb.	2.0 lb.
	Diazinon	3.0 lbs.	0.5 lb.
	Diazinon Dust	0.12 lb.	0.12 lb.
	Guerneys Lawn and Garden Granular Insecticide	1.0 lb	1.0 lb.
	Ortho Diazinon Granules	1.0 lb.	1.0 lb.
	Ortho dust	1.0 lb.	1.0 lb.
	Ortho Vegetable Gurar Soil Insect Killer	1.0 lb.	1.0 lb.
Dichloberil	Casoron	100.0 lbs.	100.0 lbs.
Dinoseb	Premerge/Dinitro	41.0 lbs.	41.0 lbs.
Drione	Drione Aer.	151.0 lb.	151.0 lb.
Ficam W	Ficam W	40.0 lb.	40.0 lbs.

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POUNDS OF PESTICIDES USED IN 1984*

Common Name	Trade Name	Purchased	Utilized
	Ficam W	1.0 lb.	1.0 lb.
	Ficam W	7.0 lbs	7.0 lbs.
Fruit tree and Berry spray	Science	1.0 lb.	1.0 lb.
Fumarim	AL RAT	30.0 lbs.	30.0 lbs.
Fungicide	J & P Fungicide	25.0 lb.	25.0 lb.
Glyphosate	Roundup	1.0 lb.	1.0 lb.
	Roundup	4.0 lb.	4.0 lb.
	Roundup	2.0 lbs.	2.0 lbs.
Golden Maiden	Golden Maiden	60.0 lb.	60.0 lb.
Hyvar X	Hyvar X	3376.0 lb.	3376.0 lb.
	Hyvar X	300.0 lbs.	300.0 lbs.
Kinoprene	Enstar	1.0 lb.	1.0 lb.
Krovar	Krovar	50.0 lbs.	0.0 lbs.
	Monobor-Chlorate	350 lb.	350 lb.
Linuron	Lorox	4.0 lbs.	4.0 lbs.
Lorox	Linuron	24.0 lb.	24.0 lb.
Malathion, Captan, Methoxychlor	Guerneys combination fruit spray	1.0 lb.	1.0 lb.
Max Force	Max Force	115.0 lb.	115.0 lb.
Metribuzin	Metribuzin	0.5 lb. ai.	0.5 lb. ai.
	Sencor	25.0 lb.	25.0 lb.
MSMA	Glowon	0.27 lb. ai.	0.27 lb. ai.
Phaltan	Phaltan	1.0 lb.	1.0 lb.
Picloram	Tordon	250.0 lb.	250.0 lb.
	Tordon 10K	450.0 lbs	450.0 lbs
	Tordon 10K	600.0 lb.	600.0 lb.
	Tordon 10K	25.0 lb.	25.0 lb.
Povidone iodine	Weseodyne	110 lb.	110 lb.
Pramatol - granular	Pramatol	1000.0 lbs.	1000.0 lbs.
Pre emergent chickweed seed killer	Pre emergent chickweed seed killer	3.0 lbs.	3.0 lbs. granular
Pronamide	Kerb 50-W	24.0 lb.	24.0 lb.
	Kerb-50W	4.0 lb.	4.0 lbs.
	Kerb-50W	3.0 lb.	1.0 lb.
Pyrethrin	Pyrethrin Aer.	1035.0 lb.	1035.0 lb.
Pyrethrin/Baygon	Pyrethrin/Baygon	52.0 lb.	52.0 lb.
Roach Rrufe	Roach Prufe	2.0 lb.	2.0 lb.
Rotenone	Rose & Floral Dust	1.0 lb.	4.0 oz.
	Rotenone	1.0 lb.	1.0 lb.
Simazine	Simazine	0.5 lb.	0.5 lb.
Soildusts	Miller's	1.0 lb.	1.0 lb.
Sys-tem	Sys-tem Grn.	180.0 lb.	180.0 lb.
Systemic	Science Systemic	3.0 lb.	3.0 lb.
Temik	Temik	10.0 lb.	10.0 lb.
Terbacil	Subar	10.0 lbs	10.0 lbs.
Thiram 10 % / Methoxychlor 5%	Boxide Bulb Dust	2.0 lb.	2.0 lb.
Thiram 50% / Methoxychlor 5%	Science Bulb Dust	1.0 lb.	1.0 lb.
Treflan	Treflan	40.0 lbs.	40.0 lbs.
Vapona	Vapona Aer.	79.0 lb.	79.0 lb.
Warfarin	Warfarin	5.0 lb.	5.0 lb.
Weed & Feed	Weed & Feed	27,301.0 lb.	27,301.0 lb.
Zineb 5%	Zineb 5%	1.0 lb.	0.25 lb.

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RIGHT OF WAY/UTILITY CORRIDOR PESTICIDE USE*

Common Name	Trade Name	Purchased	Utilized
2,4-D	Amine 4	12.0 gal.	7.0 gal.
Amizol	Amizol	537.0 lb.	537.0 lb.
Banvel XP	Velsicol	1150.0 lbs.	1150.0 lbs.
Constrict	Constrict	5.0 gal.	5.0 gal.
Glyphosate	Roundup	2.0 gal.	0.0 gal.
Hyvar X	Hyvar X	3376.0 lb.	3376.0 lb.
Krovar	Krovar	50.0 lbs.	0.0 lbs.
	Monobor-Chlorate	350 lb.	350 lb.
OSP Amine	Diathylamine/ Dichlorophenoxyoeetic	5.0 gal.	0.0 gal.
Picloram	Tordon 10K	450.0 lbs	450.0 lbs
Pramitol 25E	Propazine	31.0 gal.	14.0 gal.

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TIMBER INDUSTRY PESTICIDE USE*

Common Name	Trade Name	Purchased	Utilized
Creosote	Atco	100.0 gals.	100.0 gals
Marine Woodlife	Marine Woodlife	20.0 gals.	20.0 gals.
Woodlife II	Woodlife II	20.0 gals.	20.0 gals.
Woodlife Wood Preservative	Roberts	20.0 gal.	20.0 gal.

*Data in these tables is presented as it was reported to EPA.

SEAFOOD PROCESSOR PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
	All-Det		
	Anti-Bac-B		
	Big Red		
	Bolt - P3610		
	Bolt - Water based		
	C 16 Chlorine (powdered)		500.0 lb.
	Chemprocide		
	Chemprocide		
	Chemprocide		
	Chlorine		300.0 lb.
	Control		48.0 gal.
	D-Con		
	DLP 787		
	End Bac II		
	Iocide		
	Iocide		
	Iocide		
	Iocide		55.0 gal.
	Iocide		55.0 gal.
	Iocide		
	Iocide		
	Iodine Scrub		
	Liq-U-Klor		
	Oxyban		60.0 gal.
	Pace C-16		150.0 lb.
	Pace T-20		
	Pace T-20-SX		
	Pace T-20-X		
	Pace T-20-X		
	Pace T-20-XX		300.0 gal.
	Pace T-60		
	Pace T-60-XX		110.0 gal.
	Pace T-60-XX		
	Perma - Dust PT 240		
	Redi-Prep		60.0 gal.
	Roach Bait		
	Super Chlor		
	Super-Cidol	18.0 gal.	18.0 gal.
	Thorite		
	Tri-Samite		
	Vaposector	6.0 gal.	6.0 gal.
	Warfarin	small	
	Wood Preservative		
	WT-21		55.0 gal.
	WT-61		55.0 gal.
Aeromaster	AeroMaster		25.0 gal
Ammonium chloride	Chemprocide		
	Zep Natural		
	Zepamine A		
Bacteriacide	Liq-U-Klor		
Baygon	Baygon 1.5	limited	
Break-up	Break-up	30.0 gal.	30.0 gal.
Chemprocide	Chemprocide	110.0 gal.	110.0 gal.
Chlorinated Alkali	Master Kleen		110.0 gal.
Chlorinated Sanitizer	Anti-Bac		
Chlorine	Bottled chlorine	1035.0 lb	1035.0 lb.
	Chlorine		
	Chlorox		
	CL-9		20.0 lb.
	Gaseous Chlorine	300.0 lb.	300.0 lb.
	HTH Chlorine	400.0 lb.	400.0 lb.
	SC-16 Chlorine		
	Scan C-16		

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SEAFOOD PROCESSOR PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
Cleanser	Cleanser		400.0
D-Con	D-Con	3.0 lb.	3.0 lb.
D-Sect	D-Sect		
Diazinon	Diazinon	0.5 gal.	0.5 gal.
Diphacin-110	Diphacin-110	260.0 oz.	260.0 oz.
Disinfectant	Forward D.C.		
Fogger	Fogger	2.5 gal.	2.5 gal.
Germicide	Envy		
Glyphosate	Roundup	0.25 gal.	0.25 gal.
Iocide	Iocide	55.0 gal.	55.0 gal.
	Iocide	55.0 gal.	55.0 gal.
	Iocide	100.0 gal.	100.0 gal
	Iocide	312.0 gal.	312.0 gal.
Iodaphor	Du-San		36.0 gal.
Iodine	Zep-I-Dine		
Iotafore	Iotafore		
Liquid Warfarin	Warfarin		
Niclon 70-G	Niclon 70-G		
Ortho-Tolidine	Ortho-tolidine		
Pace %-20-XX	Pace T-20-XX		
Pace T-60-XX	Pacd T-60-XX		
Sodium Hypochlorite	Liquichlor		
Soilax	MikroQuat		
T-60-5X	T-60-5x	275.0 gal.	275.0 gal
Warfarin	Warfarin		
Water Treatment	Calcium Hypochlorite		
Zep Formula 50	Zep Formula 50	165.0 gal.	165.0 gal.

*Data in these tables is presented as it was reported to EPA.

OIL INDUSTRY BIOCIDE USE*

Common Name	Trade Name	Purchased	Utilized
Glutaraldehyde	OFC B-649	1300.0 gal.	1300.0 gal.
Visco	Visco	43,305.0 gal.	43,305.0 gal.
X-CIDE	X-CIDE	5000.0 gal.	5000.0 gal.

*Data in these tables is presented as it was reported to EPA.

ALASKAN AGRICULTURE PESTICIDE USE*

Common Name	Trade Name	Purchased	Utilized
2,4-D	2,4-D	83.75 gal.	83.75 gal.
	2,4-D	112.5 gal.	112.5 gal.
	2,4-D	26.38 gal.	26.38 gal.
	2,4-D	75.0 gal.	75.0 gal.
	2,4-D	125.0 gal.	125.0 gal.
Chlorpyrifos	Lorsban	2.0 gal.	2.0 gal.
Chlorsulfuron	Glean	1.0 gal.	1.0 gal.
Copper Sulfate	Copper Sulfate	2.0 lb.	2.0 lb.
Cygon	Cygon	1.0 gal.	1.0 gal.
Diazinon	AG-500	10.0 gals.	10.0 gals.
	Diazinon	2.0 gal.	2.0 gal.
	Diazinon	1.0 gal.	1.0 gal.
Dinoseb	Premerge	1.0 gal.	1.0 gal.
	Premerge	60.0 gal.	60.0 gal.
	Premerge	35.0 gal.	35.0 gal.
	Premerge/Di-Nitro Weed Killer	30.0 gal.	30.0 gal.
Glyphosate	Roundup	5.0 gal.	
	Roundup	1.0 gal.	1.0 gal.
	Roundup	15.0 gal.	15.0 gal.
	Roundup	2.0 gal.	2.0 gal.
Golden Maiden	Golden Maiden	60.0 lb.	60.0 lb.
Linuron	Lorox	4.0 lbs.	4.0 lbs.
Malathion	Malathion	1.0 gal.	1.0 gal.
Pronamide	Kerb-50W	4.0 lb.	4.0 lbs.
Terraclor	Terraclor	90.0 gal.	90.0 gal.

*Data in these tables is presented as it was reported to EPA.

MILITARY PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
2,4-D	2,4-D	200.0 gal.	200.0 gal.
	2,4-D	100.0 gal.	100.0 gal.
	2,4-D Eml.	100.0 gal.	100.0 gal.
	2,4-D Eml.	198.0 gal	198.0 gal.
Ammate - XNI	Ammate - XNI	14,000.0 lbs.	14,000.0 lbs.
Baygon	Baygon (Bait)	20.0 lbs.	20.0 lbs.
	Baygon (Liquid)	31.0 gal.	31.0 gal.
	Baygon 1.5	3.0 gal.	3.0 gal.
	Baygon Bait	40.5 lb.	40.5 lb.
	Baygon Eml.	129.3 gal.	129.3 gal.
Baygon/Vapona	Baygon/Vapona	14.0 lbs.	14.0 lbs.
Boric Acid	Boric Acid	614.0 lb.	614.0 lb.
	Boric Acid dust	200.0 lb.	200.0 lb.
	Boric Acid PT-240	25.0 lbs.	25.0 lbs.
BP-300	BP-300	4.0 gal.	4.0 gal.
Bromacil/Diuron	Krovar I	500.0 lb.	500.0 lb.
Chlorpyrifos	Chlorpyrifos Eml.	281.5 gal.	281.5 gal.
	Dursban	3.0 gal.	3.0 gal.
	Dursban	2.3 gal.	2.3 gal.
	Dursban 2E Eml.	429.5 gal.	429.5 gal.
	Dursban Eml.	22.4 gal.	22.4 gal.
	Dursban-M	3.0 gal.	3.0 gal.
D-Phenothrin	D-Phenothrin	unknown	
	D-Phenothrin Aer.	84.5 lb.	84.5 lb.
D-Plus	D-Plus Dust	42.0 lb.	42.0 lb.
D-Sect	D-Sect Aer.	130.0 lb.	130.0 lb.
D-TOX 4E	D-TOX 4 E	9.0 gal.	9.0 gal.
Diazinon	Diazinon 4E	2.0 gal.	2.0 gal.
	Diazinon dust	0.12 lb.	0.12 lb.
	Diazinon Eml.	478.5 gal.	478.5 gal.
	Diazinon Powder	30.0 gal.	30.0 gal.
Dichlorvos	Dichlorvos	o33.9 gal.	633.9 gal.
Diphacin	Diphacin	10.0 blocks	10.0 blocks
Drione	Drione Aer.	151.0 lb.	151.0 lb.
Ficam W	Ficam W	40.0 lb.	40.0 lbs.
	Ficam W	1.0 lb.	1.0 lb.
Hyvar X	Hyvar X	300.0 lbs.	300.0 lbs.
Knockout	Knockout	276.0 gal.	276.0 gal.
Malathion	Malathion	16.0 gal.	16.0 gal.
	Malathion	20.0 gal.	20.0 gal.
	Malathion Eml.	663.5 gal.	663.5 gal.
Max Force	Max Force	115.0 lb.	115.0 lb.
Picloram	Tordon	250.0 lb.	250.0 lb.
Prometon	Prometon Eml.	550.0 gal.	550.0 gal.
Pyrenone	Pyrenone	138.0 gal.	138.0 gal.
Pyrethrin	Pyrethrin	30.0 gal.	30.0 gal.
	Pyrethrin	6.7 gal.	6.7 gal.
	Pyrethrin Aer.	1035.0 lb.	1035.0 lb.
	Pyrethrin Eml.	122.0 gal.	122.0 gal.
Pyrethrin/Baygon	Pyrethrin/Baygon	52.0 lb.	52.0 lb.
REPCO-TOX	REPCO-TOX	105.0 GAL.	105.0 GAL.
Sys-tem	Sys-tem Grn.	180.0 lb.	180.0 lb.
Vapona	Vapona Aer.	79.0 lb.	79.0 lb.
Warfarin	Warfarin	5.0 lb.	5.0 lb.
Weed & Feed	Weed & Feed	27,301.0 lb.	27,301.0 lb.
Zep	Zep Eml.	1800.0 gal.	1800.0 gal.

*Data in these tables is presented as it was reported to EPA.

FISH HATCHERY PESTICIDE USE*

Common Name	Trade Name	Purchased	Utilized
Argentyne	Argentyne	55.0 gal.	55.0 gal.
	Argentyne	174.0 gal.	174.0 gal.
Betadine	Betadine	1.0 gal.	1.0 gal.
	Betadine	140.0 gal.	140.0 gal.
Chlorine	Calcium Hypochloride	100.0 lb.	50.0 lb.
	HTH	10.0 lb	10.0 lb.
	Sodium Hypochlorite	12.0 gal.	12.0 gal.
Formalin	Formaladehyde	5.0 gal.	55.0 gal.
	Formaldehyde	20.0 gal	20.0 gal.
	Formaldehyde	30.4 gal.	30.4 gal.
	Formaldehyde	5.0 gal.	5.0 gal.
	Formaldehyde	3.0 gal.	3.0 gal.
	Formaldehyde	1703.0 gal.	1703.0 gal.
Iodine Disinfectant	Argentyne	50.0 gal.	50.0 gal.
Iodophor	Argentyne	18.0 gal.	18.0 gal.
Povidone iodine	Weseodyne	110 lb.	110 lb.

*Data in these tables is presented as it was reported to EPA.

MOSQUITO CONTROL PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
Bacillus Thuringensis var. Isralensis	Teknar BTI	15.0 gal.	15.0 gal.
Malathion	Cythion	100.0 gal.	100.0 gal.
	Cythion Naled	.06 gal.	.06 gal.
	Malathion	34.0 gal.	34.0 gal.
Malathion 95%	Cythion	10.0 gal.	1.0 gal.
Pyrethrin	Pyrenone	140.0 gal.	110.0 gal

*Data in these tables is presented as it was reported to EPA.

ACTIVE COMMERCIAL APPLICATOR PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
2-(1 Methyletnoxy)phenol methylcarbamate	Precor residual fogger	0.1 gal.	0.05 gal.
2,4-D	Lilly Miller Dandelion Killer	1.25 gal.	1.25 gal.
Baygon	Baygon		
Bayleton 25W	Bayleton 25W	2.0 lbs.	2.0 lbs.
Benomyl	Benlate	.28 gal.	.28 gal.
Captan	Captan Fungicide Powder	1.0 lb	0.2 lb.
Chlorpyrifos	Dursban		
	Dursban 4E	1.5 gal.	1.5 gal.
	Lorsban	5.0 gal	5.0 gal.
Diazinon		.25 gal.	.25 gal.
	Diazinon	19.0 gals.	19.0 gals.
	Diazinon	4.0 gal.	4.0 gal.
	Diazinon		
	Diazinon	0.06 gal.	0.02 gal.
	Diazinon 4E	4.0 gal	4.0 gal
	Diethyl Phosphorotsote	1.0 gal	1.0 gal.
Dimethylphosphorothiozte	Metasystox R2	23.0 gals.	23.0 gals.
Dinoseb	Premerge	40.0 gal.	40.0 gal.
	Premerge	5.0 gal.	5.0 gal.
Fenocil	Fenocil non-selective weed killer	110.0 gal	110.0 gal
Ficam W	Ficam W	7.0 lbs	7.0 lbs.
	Ficam W		
Glyphosate	Roundup	3.0 gal	3.0 gal.
	Roundup	2.0 gal.	2.0 gal.
Killmaster	Killmaster		
Lawn Weed Killer A	Lawn Weed Killer A	1.5 gal.	1.5 gal.
Lindane	Isotox	4.0 gals.	4.0 gals.
Lindane-isotox	Lindane	14.0 gal	14.0 gal
Lorox	Linuron	24.0 lb.	24.0 lb.
Malathion	Malathion	0.125 gal.	0.125 gal.
	Malathion	19.0 gals.	19.0 gals.
	Malathion	0.06 gal.	0.06 gal.
Metasystox-R	Metasystox-R	12.0 gal	12.0 gal
Metasystox-R2	Metasystox-R2	6.0 gal.	6.0 gal.
Methoxychlor	Methoxychlor	0.05 gal.	0.02 gal.
Nicotine Fumigant	Nicotine Fumigant	1.5 gal..	0.75 gal.
Orthene		0.5 gal.	0.5 gal
Picloram	Tordon 10K	25.0 lb.	25.0 lb.
Pramatol - granular	Pramatol	1000.0 lbs.	1000.0 lbs.
Promar	Promar		
Pronamide	Kerb 50-W	24.0 lb.	24.0 lb.
Resmethrin	Resmethrin	0.56 gal.	0.56 gal.
Talon	Talon		
Tree Killer	Silvigar 510	0.25 gal.	0.25 gal.
Treflan	Treflan	40.0 lbs.	40.0 lbs.
White Fly Spray	White Fly Spray	0.06 gal.	0.06 gal.
Zep Stop		0.4 gal..	0.4 gal.
	Zep	3.12 gal.	3.12 gal.

*Data in these tables is presented as it was reported to EPA.

GOVERNMENT PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
2-(1 Methyletnoxy)phenol methylcarbamate	Precor residual fogger	0.1 gal.	0.05 gal.
Agrimycin	Agrimycin	1.0 lb.	1.0 lb.
Agrochem	Agrochem		
Bait Blocks	B & G	30.0 lbs.	30.0 lbs.
Benomyl	Benlate	10.0 lb.	10.0 lb.
	Benlate 50 WP	14.0 lb.	14.0 lb.
	Dexol Benlate	.012 gal.	.012 gal.
Benomyle	Benlate	Unknown	
Bromoxynil	Buctine	10.0 gal	10.0 gal
Captan	Captan	10.0 lb.	10.0 lb.
	Captan 50 WP	3.0 lb.	3.0 lb.
Carbaryl	Sevin		
Carboxin Thiram	Vitavax 200	55.0 gal	55.0 gal
Chlorothalonil	Daconil 2787	3.0 lb. ai	3.0 lb. ai
Chlorpyrifos	Lorsban	5.0 gal	5.0 gal.
Chlorsulfuron	Glean	1.0 lb	1.0 lb
Diazinon	Diazinon 5%	400.0	400.0
	Diethyl Phosphorotsote	1.0 gal	1.0 gal.
Dicamba	Banuel	5.0 gal	5.0 gal
Dichloberil	Casoron	100.0 lbs.	100.0 lbs.
Dinoseb	Premerge	15.0 gal	15.0 gal
	Premerge	40.0 gal.	40.0 gal.
	Premerge	25.0 gal.	25.0 gal.
Ethazol	*dexol Trueban	0.03 gal.	0.03 gal.
	Science Trueban	0.07 gal.	0.07 gal.
Fenocil	Fenocil non-selective weed killer	110.0 gal	110.0 gal
Fluazifop-butyl	Fusillade	1.0 gal	1.0 gal
Fumarim	AL RAT	30.0 lbs.	30.0 lbs.
Glyphosate	Roundup	30.0 gal	30.0 gal
	Roundup	0.25 gal.	0.125 gal.
	Roundup	3.0 gal	3.0 gal.
	Roundup	4.0 lb.	4.0 lb.
IPC	Chemttoe	5.0 gal	5.0 gal
Kinoprene	Enstar	1.0 lb.	1.0 lb.
Lorox	Linuron	24.0 lb.	24.0 lb.
Malathion	Malathion	1.0 gal.	1.0 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion Science		
MCPP	Chipco Turf	15.0 gal	15.0 gal
Methly Bromide	Methly Bromide	2.5 gal.	2.5 gal.
Nicotine Sulfate	Nicotine Sulfate	6 bombs	6 bombs (4 did not work)
none			
Phaltan	Phaltan	1.0 lb.	1.0 lb.
Picloram	Tordon 10K	600.0 lb.	600.0 lb.
	Tordon 10K	25.0 lb.	25.0 lb.
Pronamide	Kerb 50-W	24.0 lb.	24.0 lb.
PT 1200	PT 1200	1 aerosol container	
Resmethrin	Resmethrin	4.7 gal.	4.7 gal.
Systemic	Science Systemic	3.0 lb.	3.0 lb.
Temik	Temik	10.0 lb.	10.0 lb.
Temil Bomb	Temil	5 bombs	5 bombs
Terbacil	Sinbar	10.0 lbs	10.0 lbs.
Terraclor	Terraclor	30.0 gal.	30.0 gal.
Vapam	Vapam	5.0 gal.	5.0 gal.
Zep Stop	Zep	3.12 gal.	3.12 gal.

*Data in these tables is presented as it was reported to EPA.

PRIVATE PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
		1.0 qt.	1.0 qt.
2,4-D	2,4-D	1 bottle	1 bottle
	2,4-D Clover and Chickweed killer	0.125 gal.	0.0 gal.
	Cenex	10.0 gal.	10.0 gal.
	Cenex 40A Weed Killer	245.0 gal.	245.0 gal
Ant Sticks	Ant Sticks	6 sticks	6 sticks
Bek Leaf White Fly and Mealy Bug Spray	Bek Leaf White Fly and Mealy Bug Spray	Unknown small quantity	
Benomyl	Benlate	2.0 lb.	2.0 lb.
Captan	Captan	Unknown small quantity	
Carbaryl	Sevin	0.5 gal.	0.25 gal.
	Sevin 5%	1.0 lb.	4.0 oz.
Chlordane	Chlordane	1.0 gal.	1.0 gal.
Chloroban	Dursban	3.0 lb.	3.0 lb.
Chlorpyrifos	Dursban/Chlorban	1.0 lb.	1.0 lb.
Chlorsulfuron	Glean	1.54 gal.	1.54 gal.
	Glean	27.0 lb.	25.0 lb
Curry's Slug and Snail Bait	Curry's Slug and Snail Bait	2.0 lb.	2.0 lb.
Cycloprpoane carboxylate	Amway Bug Spray	2.0 lbs.	2.0 lbs.
Cygon 2-E	Cygon 2-E	.01 gals.	.01 gals.
	Pratt	.25 gal.	.125 gal.
Deadline Slug Control	Deadline Slug Control	1 bottle	1 bottle
Dexol	Dexol Systemic	1.0 lb.	1.0 lb.
	Systemic house plant insecticide	.06 gal.	.06 gal.
Di-Syston	Cole's Systemic House Plant Insecticide	.06 gal.	.06 gal.
	Dexol Systemic House Plant Insecticide	.06 gal.	.06 gal.
Diazinon		4	4
	Diazinon	1.0 lb.	1.0 lb.
	Diazinon	.125 gal.	.125 gal.
	Diazinon	0.25 gal.	0.25 gal.
	Diazinon	0.25 gal.	0.25 gal.
	Diazinon	0.125 gal.	0.125 gal.
	Diazinon	0.125 gal.	0.05 gal.
	Diazinon	3.0 lbs.	0.5 lb.
	Diazinon	2.0 lb.	2.0 lb.
	Diazinon	0.125 gal.	0.125 gal.
	Guerneys lawn and garden granular insecticide	1.0 lb	1.0 lb.
	Namco	1.0 gal.	1.0 gal.
	Ortho Diazinon Granules	1.0 lb.	1.0 lb.
	Ortho Diazinon liquid	0.5 gal.	0.5 gal.
	Ortho Diazinon powder	Unknown small quantity	
	Ortho dust	1.0 lb.	1.0 lb.
	Ortho Fruit and Vegetable Insect Control	0.125 gal.	0.125 gal.
	Ortho Vegetable Gurar Soil Insect Killer	1.0 lb.	1.0 lb.
Dinoseb	Premerge	0.25 gal.	0.25 gal.
Ficam	Ficam		
Fruit tree and Berry spray	Science	1.0 lb.	1.0 lb.
Fungicide	J & P Fungicide	25.0 lb.	25.0 lb.

*Data in these tables is presented as it was reported to EPA.

PRIVATE PESTICIDE USES*

Common Name	Trade Name	Purchased	Utilized
Glyphosate	Roundup	0.25 gal.	0.25 gal.
	Roundup	0.25 gal.	0.06 gal.
	Roundup	0.125 gal.	0.125 gal.
	Roundup		
	Roundup	2.0 lbs.	2.0 lbs.
	Roundup		
Herbicides			
Isotox	Isotox	0.125 gal.	0.125 gal.
	Isotox		
Kelthane	Kelthane	Unknown	
	Kelthane	0.05 gal.	0.05 gal.
Kleenup	Kleenup	0.25 gal.	0.25 gal.
Knockout	Lilly Knockout	0.5 gal.	0.5 gal.
KXL	Agro	0.25 gal.	0.125 gal.
Malathion	Dowl Malathion	6.0 gal.	6.0 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion	0.125 gal.	0.025 gal.
	Malathion	0.125 gal.	0.125 gal.
	Malathion	0.25 gal.	0.25 gal.
	Malathion	0.25 gal.	0.25 gal.
	Malathion	1.0 gal.	1.0 gal.
	Malathion		
	Malathion 50	0.25 gal.	0.25 gal.
	Ortho	0.06 gal.	0.06 gal.
	Ortho	0.25 gal.	0.125 gal.
Malathion, Captan, Methoxychlor	Guerneys combination fruit spray	1.0 lb.	1.0 lb.
Metaldehyde	Deadline	0.125 gal.	0.125 gal.
Millers Systemic Fungicide	Millers Systemic Fungicide	Unknown small quantity	
Orthene	Ortho	0.25 gal.	0.125 gal.
Ortho Rose Food and Systemic	Ortho Rose Food and Systemic	3.5 gal.	3.5 gal.
Parathion	Del Parathion	2.0 gal	2.0 gal
Pre emergent chickweed seed killer	Pre emergent chickweed seed killer	3.0 lbs.	3.0 lbs. granular
Pronamide	Kerb-50W	3.0 lb.	1.0 lb.
PT 1300	PT 1300	3 aerosol containers	
Pyrethrin	Ortho Rose and Flower Killer	0.19 gal.	0.19 gal.
	Pyrethron	Unknown	
	Whitmire and Johnson's Bait	3.7 gal.	3.7 gal.
Raid Home and Garden	Raid Home and Garden		
Roach Rrufe	Roach Prufe	2.0 lb.	2.0 lb.
Rotenone	Rose & Floral Dust	1.0 lb.	4.0 oz.
	Rotenone	1.0 lb.	1.0 lb.
Safer's Insecticidal Soap	Safer's Insecticidal Soap	1 bottle	1 bottle
Seek Parasitic nematode	Seek Parasitic nematode	2 vials	none
Soildusts	Miller's	1.0 lb.	1.0 lb.
Thiram 10 % / Methoxychlor 5%	Boxide Bulb Dust	2.0 lb.	2.0 lb.
Thiram 50% / Methoxychlor 5%	Science Bulb Dust	1.0 lb.	1.0 lb.
Trithion	Dowl Trithion	1.5 gal	1.5 gal
Weed-B-Gone	Weed-B-Gone	1 small can	
Zineb 5%	Zineb 5%	1.0 lb.	0.25 lb.

*Data in these tables is presented as it was reported to EPA.

EXPERIMENTAL PESTICIDE USE*

Common Name	Trade Name	Purchased	Utilized
2,4-D	2,4-D	0.725 gal.	0.725 gal.
	2,4-D Amine	0.25 gal.	0.25 gal.
Avenge	Avenge	25.0 gal.	25.0 gal.
Banvel	Banvel	0.78 gal.	0.78 gal.
Bromoxynil	Bromoxynil	0.125 gal.	0.125 gal.
	Buctril	4.4 gal.	4.4 gal.
	Buctril	12.5 gal.	12.5 gal.
	Buctril	0.25 lb.	0.25 lb.
Chloroxuion	Chloroxuion	0.5 lb.	0.5 lb.
Chlorpyrifos	Lorsban	0.25 lb.	0.25 lb.
Chlorsulfuron	Glean	11.5 oz.	11.5 oz.
	Glean	0.12 gal.	0.12 gal.
	Glean	0.1 lb. ai	0.1 lb. ai.
DCPA	Dacthal	0.5 lb.	0.5 lb.
Dicambia	Dicambia	0.125 gal.	0.125 gal.
Dinoseb	Premerge	18.7 gal.	18.7 gal.
	Premerge	0.125 gal.	0.125 gal.
	Premerge/Dinitro	41.0 lbs.	41.0 lbs.
Diphenamid	Diphenamid	0.125 gal.	0.125 gal.
Glyphosate	Roundup	6.0 gal.	6.0 gal.
	Roundup	1.0 lb.	1.0 lb.
MCPS	MCPS	0.125 gal.	0.125 gal.
Metribuzin	Metribuzin	0.5 lb. ai.	0.5 lb. ai.
	Sencor	25.0 lb.	25.0 lb.
MSMA	Glowon	0.27 lb. ai.	0.27 lb. ai.
Simazine	Simazine	0.5 lb.	0.5 lb.

*Data in these tables is presented as it was reported to EPA.

Based on the survey, there was an estimated 105,400 gallons and 108,520 pounds of pesticides used in Alaska during the 1984 calendar year. Rodenticides, herbicides and insecticides were used throughout the user group categories identified in the following section. Disinfectants were used primarily in the seafood category, fungicides primarily by hatchery operations and biocides only by the oil industry. Reported wood preservative uses were primarily by the timber industry, but it must be recognized that this value does not represent private and other uses of these substances.

As noted in the section entitled "Profile Limitations", pesticide values reported for 1978 exceed those for 1984 in certain categories. The 1978 study reports pesticide use at 220,261 pounds and 23,262 gallons versus 1984 extrapolated use data of 108,520 pounds and 105,400 gallons.

Over one-half of the total poundage and slightly less than one-half of the gallonage reportedly used in 1978 was herbicides, with over one-third of this total amount being 2,4-D. Approximately two-thirds of the total pesticide use was agricultural in nature with the remainder being used for vegetation control, primarily on right of ways. In 1984, herbicides again comprised approximately one-half the total poundage used but less than one-tenth the gallonage. Herbicide use for vegetation control on right of ways was no longer significant. In 1984 only a minimal amount of herbicides were used for right of way applications due to restrictive state policies and negative public perceptions of the activity. In 1978, herbicide use for vegetation control was still practiced by numerous utilities, pipeline companies and the Department of Transportation. With regard to the agricultural values, it is not expected that actual use has declined significantly but rather that larger farming entities in the State may not have responded to the questionnaire.

Fungicide and insecticide data also appear to be skewed by the probable lack of response from part of the agricultural and greenhouse community. Fungicide uses reported for 1984 were primarily the result of fish hatchery operations, whereas those reported in 1978 were associated primarily with agriculture. In 1978, over one-third of the total insecticides used were malathion and pyrethrins for mosquito control, with the remainder primarily for commercial agriculture and greenhouse uses. Once again, this difference is attributed to a possible change in attitude regarding pesticide use with regard to large scale mosquito control programs.

The above information can be used to draw some conclusions regarding trends, such as decreased herbicide use for right of way vegetation control. Additionally, it may indicate underestimated use for agricultural activities. Again, this emphasizes the need to utilize these numbers in relative terms as gross estimates of pesticide use, rather than firm values for the given calendar year.

Use Characteristics

Time of Application

As one might expect, time of pesticide application and use depends a

great deal on the user and industries involved, as well as the target pest.

Herbicide applications occur primarily during the months of May through August, which is about the extent of the outdoor Alaskan growing season. Correspondingly, the maximum use of insecticides in outdoor situations also occurs during these same months. Insecticides use by private users is year-round, which probably reflects indoor uses for houseplants and greenhouses. Also, the military uses pesticides year-round for control of insects. Cockroaches and other pests are introduced by the transient military population.

Fish hatchery use of pesticides is generally year-round, while the majority of pesticide use by the seafood industry currently occurs April through September. This trend will change as the seafood industry moves toward more year-round processing.

Golf course uses are minimal and will only occur in the summer months, as is also the case with the timber industry. Biocide use is year-round.

Use Characteristics

Manner and Method of Application

The majority of pesticides used in the State are applied via some type of ground application method. There are approximately four aerial pesticide applicators in the State, but their activities are minimal. However, it appears that aerial application of insecticides for mosquito control is a future use trend. During 1984 and 1985, this method was not utilized.

Tree spraying is predominately conducted in Anchorage and other Southcentral Alaska areas for aphid control. However, as a result of Anchorage residents concerns about spraying and the associated drift, root injection, soil drenching or pesticide implantation may become more common application techniques. Such a change is further prompted by the relatively high wind conditions which exist in Anchorage for a large part of a working day.

Other pesticide application methods are fairly standard. Wood preservatives such as Creosote and penta are primarily painted on. There are no pressure treating facilities for wood products in the State.

Use Characteristics

Pesticide Purchases

Location of pesticide purchases provides important insight into potential control of pesticides sales in Alaska as well as the effectiveness of a State registration program. Of the 252 respondents noting purchase information for specific pesticides, approximately 40% said they mail ordered their chemicals (versus local purchase). Some of these mail orders may have occurred in the State, but by and large the

pesticides were ordered from distributors in the contiguous United States. The remainder of respondents either did not know where the pesticides they used were purchased or they did not respond to the question at all. Currently, there are only four or five dealers of restricted use pesticides in the State.

The consequence of the purchase information is two-fold. First, it is questionable whether mail order distributors of restricted use pesticides check to assure that the purchaser is certified. Additionally, tracking of mail order pesticides and potential problem use areas is much more difficult than with the local purchases.

There also appear to be purchasing trends within different user groups. Private applicators purchased almost entirely from local pesticide dealers. On the other hand, seafood processors, fish hatcheries, and the military purchased almost exclusively by mail order. Other industries and users were split fairly evenly between mail order and local pesticide purchases.

User Groups

Right of Way Vegetation Control

Railroad Maintenance

The Alaska Railroad (ARR) maintains more than 600 miles of track in Alaska, with the mainline running from Seward to Fairbanks and Whittier to Portage. Branch lines run to Palmer, Suntrana, Fairbanks International Airport and Eilson. This is the only railroad system in Alaska currently operating. Management objectives of herbicides use along the railway are the control of brush along the right of way and maintenance of the roadbed in as vegetation-free a state as possible.

In recent years railroad management has come under attack for herbicide use along the tracks, especially in the small communities along the right of way. In response to this the ARR has initiated an integrated program of hand clearing, mechanical clearing, burning and herbicide application.

For approximately 30 years the ARR has utilized herbicides as the mainstay of their vegetation control program. However, due to a court order requiring ARR to comply with National Environmental Policy Act (NEPA) requirements and the surrounding herbicide use controversy, no herbicides were applied to the track in 1984 or 1985. In January 1985, the ARR was transferred from Federal to State ownership. Since the State has no comparable requirements to NEPA, there has been some controversy over whether the Environmental Impact Statement (EIS) process must continue. The ARR had decided to complete the EIS and this environmental document is now available for public review. The ARR is required to obtain a permit from ADEC for herbicide application.

In recent years ARR has utilized three primary herbicides for vegetation control. Hyvar X and Amizol have been used as a mixture for roadbed maintenance at 6 pounds (4.8 pounds active ingredient), and 1 pound (0.9 pounds active ingredient) per 100 gallons, respectively. Tordon 101 has been used for right of way vegetation control at 1 gallon

(50% active ingredient) per 1,000 gallons. Garlon was tested in 1980, 1981 and 1982 in small quantities. Because of the unique situation which precipitated no herbicide use along the tracks in 1984 and 1985, Table 1 provides use information from 1977-1983, which is more representative of use trends. Use information for this report will reflect the 1983 year.

The ARR had proposed to apply herbicides to the track in 1985. Due to the need to conduct a worst case analysis of potential herbicide impacts and the lack of data to complete this analysis for many substances, the railroad applied for a permit from ADEC to utilize hexazinone (Velpar) for application to only the ballast area of the railway. Velpar has been through the re-registration process with EPA, and therefore, the necessary data is available. However, the unavailability of the environmental document until fall of 1985, coupled with negative public opinion, forced the ARR to withdraw their application for the 1985 calendar year.

User Groups
Right of Way Vegetation Control

Highway Maintenance

The Alaska Department of Transportation and Public Facilities (ADOTPF) has not utilized any herbicides for right of way vegetation control since 1977. This is due to a state-wide ban of these materials for State agency use, imposed by the Governor at that time and continued by the current State administration.

ADOTPF individuals responsible for maintenance agree that this trend cannot continue at a time when State budgets are being cut back and the costs of the less effective manual and mechanical brush controls are high. ADOTPF did apply for a permit to apply Watrol (active ingredient Diquat) to a float plane basin near Homer for aquatic weed control in 1984. This activity must be permitted as a public pesticide project since the substance would be applied by the State on property owned by 2 or more persons. After a public meeting the application was denied by the Alaska Department of Environmental Conservation. ADOTPF will attempt to remove the aquatic weeds by mechanical methods during 1985. If this is unsuccessful, ADOTPF will likely reapply for a permit to use herbicides in 1986.

User Groups
Right of Way Vegetation Control

Energy Corridor Maintenance

Utility companies were identified as potential users of large quantities of herbicides. The Alaska Public Utilities Commission was contacted to identify utility companies throughout the State. Seventy-nine letters were sent to utilities. The return rate within the industry was very good, with fifty-eight responses received--approximately a 75% return.

Of these facilities, six report the use of herbicides, with seven substances applied for a total of 26 gallons and 1,500 pounds of

use. One utility, Alyeska Pipeline Service Company, responded for four of its member companies who were independently surveyed. Since 1982, Alyeska has been utilizing herbicides on the TransAlaska Pipeline (TAPS) corridor, which is the longest pipeline in Alaska, running 900 miles from Prudhoe Bay on Alaska's North Slope to its terminus in Valdez. Pesticide use by Alyeska is expected to increase as the pipeline corridor revegetates.

The majority of other utility company uses are more maintenance oriented, and are expected to remain relatively stable. However, there are some utilities which have identified a need for herbicides but have discontinued use due to public pressure or because of previous lawsuits alleging pesticide misapplications. Some of these utilities, like Golden Valley Electric Association in Fairbanks, are attempting to reinitiate herbicide vegetation control programs and are encountering substantial public opposition.

All utilities which reported herbicide use are located in the more urbanized areas of the State, and have had programs in place for a number of years. Of the utilities that reported no pesticide use, a number noted that they simply did not have enough vegetation in their areas to warrant control since many of the more rural utilities are located in tundra areas.

User Groups

Timber Industry

The commercial timber industry in Alaska currently uses very few pesticides. Of twenty-six survey respondents only 2, or 7%, use any pesticides whatsoever. These consisted of commercially manufactured wood preservatives (i.e., creosote and pentachlorophenol preparations). Included in the survey were private and commercial logging activities as well as Native Corporations and joint ventures between the U.S. Forest Service and Native Corporations.

Log transfer facilities in Southeast Alaska do face a problem with Ambrosia Beetles. However, at this point all of the facilities contacted have initiated best management practices to deal with the Ambrosia Beetle problem, rather than apply pesticides. These include yard management of the timber to ensure timely delivery of the material and no overwintering. Some facilities reported the use of pheromone traps in the log yards to deal with the beetle problem. The major native corporations involved in logging activities also report no pesticide use (This group was surveyed by telephone primarily).

It was anticipated that within this group, wood preservative use would be fairly high. However, survey results indicate that this is not the case. Pursuant to follow-up conversations with some of these facility managers it was noted that most lumber or other necessary building materials are purchased pre-treated from the lower 48 states. Very little wood is treated on site with the possible exception of creosote use on marine pilings and dock construction.

Total reported wood preservative use for 1984 was 160 gallons for this industry.

User Groups

Seafood Industry

As with any large group of pesticide users, it is difficult to determine a quantitative value of pesticide use, even for a specific calendar year. In the case of the seafood industry, a small part of the industry was initially surveyed by a mailing to certified applicators. No responses were received from this group. Consequently, rather than attempting to collect use information through written correspondence, individual facilities were surveyed during compliance inspections conducted by EPA personnel. The group surveyed is considered representative of the industry. Twenty-three shore-based and floating processors from eight general locations around the State were surveyed for their pesticide uses, including Cordova, Dutch Harbor, Kodiak, Petersburg, Akutan, Dillingham, Clarks Point, and Bristol Bay. Additionally, Alaska Department of Environmental Conservation (ADEC) and U.S. Food and Drug Administration (FDA) inspectors were asked to note any pesticides they encountered during their field activities which did not have proper EPA registration or labeling. No such incidents were reported from these agencies for the 1985 calendar year. However, FDA does report that a large number of Japanese food additives are used in Alaska on products for export, which legitimizes concerns for the possibility of Japanese pesticide imports.

Total pesticide use by the group surveyed was approximately 2,500 gallons and 1,773 pounds of pesticide products. Not included in this value is the reported use of 1,335 pounds of pressurized gaseous chlorine. Pesticide use within this industry was primarily for disinfection purposes. A number of processors reported the use of standard cleaning and disinfecting solutions but did not specify types or quantities. Therefore, the total pesticide use value reported here is considered very conservative. Over 78% of the total reported use was in the disinfection category, including bactericides, fungicides, disinfectants, and hand and foot dips. Over 25% of the total disinfectant use was for a product marketed under the name Iocide, which is commonly used by the industry as a hand and foot dip prior to entering processing areas. It should be noted that nearly half of those reporting the use of Iocide did not quantify their use. Chlorine, in one form or another, is probably the most commonly used disinfectant by the seafood industry. However, in this case no one, specific product name is prevalent and the data provided by the processors does not always allow a determination the product's active ingredients.

Use of pesticides within seafood processing facilities is carefully monitored by both FDA and the ADEC in an attempt to protect and insure product quality. Small amounts of rodent baits and insecticides are also used by the industry; however, this is minimal compared to that of disinfectants. More commonly, facilities will deal with rodents and insects through management techniques such as curtains and doorways in the processing areas and good sanitation practices. A large number of processors do utilize ultraviolet light "bug zappers" to control flying insects in a non-chemical manner.

Almost all of the pesticides used by the seafood industry are mail ordered from distributors on the West Coast. Over 46% of the pesticides

used were purchased from Pacific Chemical out of the Seattle area. Many of the company headquarters for Alaskan processors are located in the Seattle area. Only one facility reported use of a Japanese manufactured pesticide. Follow-up confirmed that this substance was registered for use in the United States. Use of foreign manufactured pesticides not registered for use in the United States was initially a major concern with this industry, since a large percentage of the companies are wholly or partly owned by Japanese interests and representatives from these countries are actively involved in the processing of seafood at their plants.

For the majority of the seafood industry, pesticide use reflects a processing season which will commonly last from six weeks to five months, depending on the species being processed. However, there are plants which operate year-round in the State, and process whatever seafood is in season. For economic purposes, year-round processing is the future trend within the industry. With this in mind, pesticide use by seafood processors in Alaska will likely be on the increase.

User Groups

Biocide Use in the Oil Industry

Use of biocides by the oil industry is fairly routine for control of microbial growth during well drilling operations and down hole activities. Three major distributors of biocides were identified as providing the majority of these chemicals to the Alaskan market. Due to the sensitive nature of oil drilling activities and the tendency on the part of the oil industry to consider most of this information proprietary, it was decided that the distributors, rather than the users should be contacted for pesticide use information. For purposes of this report, the assumption is made that all biocides purchased during 1984 were utilized during the same calendar year.

All three of the companies contacted responded with biocide sales data for the 1984 calendar year. This information is being presented in a format which protects companies' individual sales data.

A total of 49,605 gallons of biocides were reportedly sold in Alaska during 1984. Of these, the most commonly used biocide agent is gluteraldehyde. This substance appears on 5 of the 17 biocide labels submitted by the distributors and accounts for at least 90% of total biocide use in the State. This number does not include data from one of the three biocide distributors, as they did not provide a chemical-specific breakdown of sales information for their products. Acetate compounds are the second most frequently sold biocide product, but account for a small percentage of total sales i.e., use. According to industry representatives, the facilities with the heaviest use of biocides are the seawater treatment plants located in Prudhoe Bay. Currently, one of these facilities is operating and one is scheduled to go on line within the year.

Biocides are used to control or inhibit the growth of bacteria, fungus, slime and other micro-organisms in oilfield operations. Use of biocides in oilfield operations is not unique to Alaska, and the

companies report no special pesticide use problems. Biocides are also used in cooling towers, however this is noted by company personnel to be a very small use compared to that of the oil industry. Information on cooling tower use was not available from the companies. Also, geographical location of the pesticide use could not be adequately determined.

Use of biocides in oilfield operations has become a controversial subject when dealing with offshore drilling. At issue is the ultimate discharge of the drilling muds and cuttings, contaminated with biocides, into waters of the United States. This issue is currently being dealt with through the National Pollutant Discharge Elimination System (NPDES) permit program under the Federal Clean Water Act.

User Groups

Agricultural Uses

Agriculture in Alaska is a growth industry, and there is a strong emphasis on the continued development of agriculture in the State from both private and government sectors.

Currently there are approximately 1.3 million acres listed as farmland, out of the total State land area of 375 million acres. It is projected that Alaska has 20 million acres of potential livestock grazing land. Currently, the majority of farmland in Alaska is used for grazing, with only 34,700 acres used for crop production. The total number of farms in Alaska during 1983 (the last year for which statistics are available) was 450, an increase of 160 farms since 1978.

Crops include oats and barley for silage, hay, potatoes, cabbage, lettuce, carrots, berries, and small quantities of other vegetables. Livestock and poultry products include eggs, poultry, beef, pork, mutton, wool, reindeer, and milk. Farm commodity cash receipts for 1983 were $18,355,000.

As a rule, most of the Alaskan farms are located along the railbelt. The Matanuska Valley is the major agricultural producing area, due to the good soils and the most suitable agricultural climate in the State. There are 10 Grade A dairies in the State, with 8 of these located in the Matanuska Valley. The other two are located in the Tanana Valley. The Tanana Valley is the second most important agricultural area in the State. In this area there are more daylight hours per day than in the Matanuska Valley, but the growing season is shorter. Most of the reindeer production occurs on the Seward Peninsula and Nunivak and Unmmak Islands, with a small number of village herds located on islands in the Bering Sea.

Other areas in the State i.e., Kenai Penninsula, Kodiak, Aleutian Chain and Southeast Alaska, exhibit primarily maritime weather. The growing season in Kenai is fairly short and frosting through mid-June is common. In the other areas crops are primarily affected by cloudy weather and frequent rains which delay crop maturity.

As the above discussion illustrates, crops grown in the State must be especially suited to cold soils, short growing season, and large

temperature variations. These conditions determine which pesticides can be used effectively in the State.

Herbicides are the most prevalently used pesticide in Alaskan agriculture, and, in fact, the only substances reported as used by the commercial farmers who provided information for this profile. Pesticide use information for the Delta farming area is complete due to assistance from the University of Alaska, with eleven out of the approximate 15 farmers in the area reporting use. Response rates from the Matanuska Valley farmers were lower, as was anticipated, since this information was requested via letter. Thirty-seven letters were sent, with 14 responses received and three letters returned as undeliverable.

From all agricultural areas a total of 70 pounds and 675 gallons of pesticides were reportedly used to cover approximately 4,020 acres of farmland. Of this, approximately 63% of the gallonage was 2,4-D (which also had the highest reported number of applications), all of which was utilized in the Delta Agricultural area. Glyphosate was second in terms of numbers of reported uses, although the quantity applied was very small. Third in use was diazinon, which is commonly used by commercial farmers and private gardeners. The fourth most frequently used pesticide was dinoseb.

Alaska farmers do face some unique agricultural problems. Perhaps the most significant is the very short growing season. Late springs and early winters occur frequently and cause difficulty for the industry. Because of this, herbicide applications must be timed precisely to achieve maximum effectiveness while still allowing adequate crop growth time. Identification of appropriate herbicides and proper timing is a major need of Alaskan farmers. Additionally, to diminish soil erosion, farmers are exploring the use of no-till agriculture. With this approach, there is an increased use of pesticides.

And last, other areas have been identified as having a high potential for agricultural development. When and if agricultural land increases in Alaska, the Nenana area, between Anchorage and Fairbanks, will likely be the next area developed, with according increases in the State's use of pesticides.

User Groups

Military Uses

The Military in Alaska is one of the largest users of pesticides in the State. Pesticide use information was obtained from the two Air Force bases, Eilson and Elmendorf, and three Army bases, Forts Richardson, Wainwright and Greeley. Data were obtained from the annual Pest Management Reports generated by the Air Force and the monthly Pest Control Reports maintained by the Army for each of its three bases.

Reportedly due to the transient nature of the military population, there is a significant use of indoor insecticides, primarily for cockroach control. These indoor uses occur year-round. The largest outdoor use of pesticides is the application of 2,4-D for dandelion control. Only one of the five facilities used a "weed and feed" formulation in lieu of 2,4-D. Applicators report the use of the low-volatile ester formulation

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of 2,4-D for the first time in 1984. The most common complaint was that the amine salts of 2,4-D, when applied in accordance with the label directions, were not effective due to cold soil conditions. Outdoor insecticide use was primarily aimed at aphid and wasp, bee or hornet control. Other indoor and outdoor pests are treated on an as needed basis. Because of differences in the various bases methods of reporting quantities of pesticides used and their concentrations, the following total use numbers should be considered close approximations. An attempt was made to clarify reporting methods and data with base personnel, but, at this point, not all questions have been resolved.

Pesticide use from all Alaska military bases totaled 4,566 gallons and 3,899 pounds. Additionally, 27,301 pounds of Weed and Feed and 14,000 of Ammate were also utilized. Reportedly, 1,800 gallons of a pesticide listed only as Zep was applied. This value was not included in the total due to the questionable nature of such a large volume of use.

User Groups
Golf Course Uses

Alaska currently has five active golf courses, located in the southcentral and northern regions of the State. Of these, two are located on military bases, Moose Run on Fort Richardson and Eagle Glen on Elmendorf Air Force Base.

Due to the short season and colder Alaskan climate, pesticide use at these facilities appears to be minimal. However, as the courses mature, pesticide use will likely increase. Currently, one facility reported use of approximately 8 gallons of Tersan for fungus control and 3 gallons of Zineb for slime mold control. These quantities are based on the assumption that each of these substances is applied an average of once per year on the greens. The fairways are not treated. A second golf course anticipated treatment for slime mold and fungus within a couple of years. A third golf course manager reported minimal use of Roundup for minor vegetation control in and around new greens. Several golf course managers reported an aphid problem, but only one used any pesticide for control. This was a general use pesticide manufactured by Ortho. Lastly, pesticide use for one of the military golf courses was included in use reports for the entire base and could not be segregated. Fertilizers were reportedly used on several of the golf courses, but they did not contain any pesticides.

It has also been noted that a new golf course is being planned by the Municipality of Anchorage for opening in 1987. This may slightly increase the quantities of pesticides used by this industry.

User Groups
Fish Hatchery Use

There are approximately 39 active fish hatcheries in the State of Alaska, all involved in the spawning and rearing of salmonid species. Of these 39 facilities, seventeen (17) are operated under the auspices of the Alaska Department of Fish and Game (ADFG). The remainder are

privately operated on a non-profit basis.

Species propagated in these hatcheries are primarily Pink and Chum Salmon, with Sockeye, Chinook and Coho being raised in smaller quantities. The type of pesticides used in these hatcheries is dependent on the salmonid species. The use of pesticides is reportedly highest for hatcheries rearing Sockeye salmon, where facilities must be kept completely sterile to minimize the risk of a devastating viral infection.

Information on pesticides use for 1984 was obtained from the ADFG for the hatchery programs they administer. Letters were sent out to twenty-three (23) private hatcheries requesting information on their pesticide use. To date seven facilities have responded, one of which is not yet operational. Total pesticide use within this industry is 170 pounds and 2,266 gallons of chemical.

Certain pesticides are commonly used by most hatcheries in the State. Formalin/Formaldehyde (37%) was used by 85% of the private hatchery operators and most, if not all, of the State operated hatcheries. It is used for treating parasites on hatchery fish, fungal infections on eggs, and disinfection.

Occasionally, a Formalin fog is used by ADFG to fumigate the interior of a hatchery building. A second pesticide commonly used by hatcheries is Chlorine (Chlorox) or HTH. Approximately 60% of private hatcheries, as well as most of the State operated facilities, utilize some form of chlorine. The chlorine is used as an equipment disinfectant, for foot baths and occasionally to destroy disease infected fish.

The other group of pesticides used in hatchery operations are iodine based antiseptics, such as Argentine, Betadine, and Wescodyne. Approximately 85% of private hatcheries use one of these chemicals.

ADFG also reported minimal use of oxytetracycelene and Tricain Methane Sulfonate during 1984.

All private hatcheries report mail ordering pesticides from a Seattle based chemical company. The ADFG also reports purchase of a larger portion of pesticides used from the same distributor.

User Groups

Mosquito Control Programs

As mentioned elsewhere in this report, mosquitoes are a problem for virtually every Alaskan community. However, the manner in which communities handle the mosquito nuisance varies. For the purposes of this report, those communities that utilize some type of area wide mosquito control are noted. Interestingly enough, this is a very small group relative to all the small communities within the State.

Communities that propose to initiate an area wide mosquito control program must obtain a permit from the Alaska Department of Environmental Conservation. Four communities, Galena, Fairbanks, Valdez, and Anderson, did spray during the 1984 calendar year. These cities used either

malathion or pyrethrins to control mosquitoes on over 8,000 acres. Two communities used a total of 200 gallons of pyrethrins. The other two communities used a total of 44 gallons of malathion (Cythion). All spraying was done from the ground by either a fogging device or Ultra Low Volume (ULV) unit mounted on the back of pick-up trucks. Spraying generally occurs from late May to early September, with the peak use in June and July. All communities reported spraying approximately three times per week, with the exception of one that sprays on a weekly or biweekly schedule.

The city governments report overwhelmingly favorable responses to the spray programs. However, there are isolated incidents of residents protesting the spraying, but by and large, the activity is applauded.

The trend towards community wide mosquito control spraying programs appears to be on the upsurge. All of the communities that currently spray, report that spraying activities will remain constant for the next few years or they have plans to expand their programs. The city of Nenana, which has not sprayed since 1978, plans to initiate aerial application of malathion during 1985. Additionally, a second community, McGrath, applied Bacillus thuringiensis during 1985 with some apparent success. There is also a test project to control mosquitoes with the use of Bacillus thuringiensis in the Kotzebue area which has been ongoing during 1984 and 1985. This project is discussed in more detail in the experimental use section of this report.

User Groups
Millwork Industry

Millworking activities were identified as potential users of wood preservatives. As such, an attempt was made to contact these facilities throughout Alaska and quantify their pesticide use.

Letters were sent to six identified active millworking establishments. Four facilities responded, and one additional letter was returned as undeliverable. Of these facilities, none reported any wood preservative or other pesticide use.

User Groups
Commercial Pesticide Use

Comparatively speaking, Alaska does not have a large number of commercial pesticide applicators doing business in the State. Letters were originally sent to all certified pesticide applicators, both private and commercial. Of the total responses in these two categories, 18 out of 114, or nearly 16%, were from commercial applicators. Of these, approximately half reported use during 1984, for a total of approximately 306 gallons and 1,122 pounds of pesticides.

However, not all of the individuals listed as commercial applicators conduct business in the true sense of the word. Some individuals are certified as commercial applicators but only apply pesticides for their employers (not pest control businesses) or privately. Using the State

certification mailing list, there was no way, in most instances, to identify a person's affiliation with a business. This led to some duplication of effort in contacting individuals.

In an attempt to quantify pesticide uses by commercial applicators in the business of pest control, a second mailing was undertaken. Letters were sent to fourteen commercial pesticide companies identified through the State certification process and community telephone books. Nine of the commercial applicators in business are located in Anchorage and a handfull of these dominate a large section of the market in Anchorage and the other communities they serve. In many instances, several follow-up conversations were initiated with the larger businesses to request responses to the original letters. Regardless of this approach, responses from this group were very low, with three businesses responding and one letter returned as undeliverable. The businesses that did respond were involved in outdoor pest control only, and used a total of 65 gallons of pesticides during 1984. All of the substances used were insecticides applied primarily during the months of May, June, July, and August. Disposal practices noted by these businesses were acceptable. Unfortunately, these responses are considered to represent a small fraction of the total pesticide use by commercial applicators in the State.

User Groups
Herd Maintenance Use

Reindeer propagation in Alaska has been a stable Alaskan industry since approximately 1891. Currently, reindeer herds can be found on the Seward and Baldwin Penninsulas and the Aleutian, St. Lawrence, St. George, and Nunivak Islands. The current reindeer population in the State is approximately 20,000 animals.

Pesticides used in herd maintenance are primarily for treatment of warble fly, nasal bots, intestinal parasites, and Brucellosis. Because these substances are used on animals designated for human consumption, most of the pesticides used must be registered by USDA.

Recently, Ivarmectin was approved by USDA for use on reindeer, partially through the channels of the IR-4 program. This substance is used for treatment of flies and bots. Research is also ongoing to develop a Brucellosis vaccine since traditional cattle vaccinations do not effectively treat this disease in reindeer populations.

Figures on the actual amount of pesticide used in this category are not available, although total quantities are likely very small.

User Groups
Government Pesticide Use

Government use of pesticides on both a State and Federal level is almost nonexistent in Alaska (excepting military uses). This is significant because a large percentage of land in Alaska is either Federally or State owned. This is partly due to negative public

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perceptions of pesticide use in Alaska and partly due to specific policies developed by involved agencies. On a State level, the previous Governor prohibited the use of pesticides in an executive order dating back to 1977. The current Governor continues to support this policy; therefore pesticides are rarely used by State agencies. Use by the Federal government reflects a similar history. Because of negative public opinion, as well as other factors, pesticide use in Alaska has never been extensive. And with the Ninth Circuit Court of Appeals ruling in 1984 requiring worst case analysis of pesticide impacts prior to application, use has been discontinued almost entirely. Therefore, the majority of pesticide uses reported by this group were from cities and municipalities, hospitals, and public service organizations (such as the Tanana Chiefs Council).

Agencies considered potential users of pesticides were contacted either by telephone or letter to determine the extent of their pesticide use. Respondents included school districts, cities and municipalities, the Public Health Service, Fish and Game, U.S. Fish and Wildlife Service, State and Federal foresters, the Department of Energy, and a correctional center as well as the other agencies noted in the following discussion.

At the Federal level, the Forest Service was considered to be one of the largest potential users. Individuals were contacted in the main offices in Anchorage and Juneau, as well as district offices. Eight timber staff offices from the southeastern part of Alaska, where the majority of the State's logging activities occur, all reported no use of pesticides by the Forest Service for at least five years. Prior to that time, they reported minimal use in some districts. The research branch of the Forest Service is responsible for coordinating all pesticide use by the agency or by private parties on Forest Service land. This includes use by Forest Service land managers and road construction and maintenance crews as well as small private logging enterprises. They report no use since the late 1970's except by the nursery in Petersburg and some small experimental plots which are discussed elsewhere in this report. Additionally, all wood preservatives were collected from the districts approximately three years ago and have not been used since. All treated wood was purchased from out of state.

Almost without exception, Forest Service employees reported that there is a strong need for herbicide use in Alaska timber management. Alder and Salmonberry are the main competitors for the desired crop production. Without herbicide use, it reportedly takes 15-20 years for trees to overgrow the pest species, whereas, with herbicide use, it takes only five years. Manual vegetation removal methods cannot be economically used to provide an adequate level of control. One Forest Service employee estimated that 10,000 to 20,000 acres of high value forestry sites never have been reforested because of herbicide use problems. The considered opinion is that without access to herbicides, reforestation is not economical.

Although the Spruce Beetle has generated concern and does represent the number one forestry and urban forestry insect pest in the State, as a whole, insects are not considered a major forestry problem in most of Alaska.

The Bureau of Land Management (BLM) reported no pesticide use in Alaska by the agency, except for small quantities of insecticides used in coastal field camps for mosquito control. Private entities with easements on BLM owned land must obtain permits for application of pesticides from BLM. Alyeska Pipeline Service Company, the management entity for the 900 mile long TransAlaska Pipeline, does request herbicide use permits annually. Alyeska pesticide use is discussed in the utility company portion of this report.

The National Park Service reported no pesticide use in any of the 13 Alaskan National Parks, monuments and preserves which cover approximately 55 million acres.

The Federal Aviation Administration also reported no pesticide use for airport maintenance in 1984 or any anticipated use in the future. However, there has been both insecticide and herbicide use by FAA in the past, primarily for maintenance of rural airports and runways. The agency has reportedly inventoried and disposed of DDT which was widely used for mosquito control throughout Alaska.

Similarly, the Army Corp of Engineers has not used pesticides in previous years. However, the agency is currently proposing herbicide use for vegetation control and dike maintenance on the Chena River flood control project near Fairbanks. The agency is proposing to test plot the three herbicides, hexazinone (Velpar), ammonium sulfate (Ammate X-ND), and glyphosate (Roundup) next year. The effectiveness of these three substances will be evaluated and soil sampling, persistence, mobility, and half-life testing will be completed. Full scale application, if considered feasible, would be conducted sometime after 1986.

The Public Health Service (PHS) does not utilize any pesticides in Alaska. PHS personnel do receive training and certification from ADEC in order to be prepared for and to be able to recognize pesticide incidents if they should occur. This is normally the same situation with Agents of the Cooperative Extension Service.

The Plant Protection and Quarantine Divison of the Department of Agriculture used aerosol resmethrin for aircraft disinfection. The amount utilized annually remains fairly constant, with 4.7 gallons applied during 1984. This agency also participates in a National Gypsy Moth Surveillance program. Pheromone traps are set in several locations throughout the State to detect any Gypsy Moth activity. To date none has been found.

The only pesticide use by the U.S. Fish and Wildlife Service is discussed under the experimental use section of this report.

At the state level, personnel from both Southcentral and Southeast offices reported that the Divison of Forestry utilized no pesticides previous to and including 1984. However, the agency indicated there would be increased herbicide use as a vegetation management tool. During the 1985 season, the agency planned on utilizing glyphosate on some test plots. This proposed use is expected to expand over the next several years. As with other agencies, the State Division of Forestry typically

used management practices to deal with the Ambrosia Beetle.

The State Division of Agriculture also had no pesticide use, although personnel may oversee or recommend pesticides to farmers. Pesticide use by private farmers is reported in the Agricultural section of this report.

Pesticide use by the State Department of Transportation is discussed under the Right of Way section of this report.

The Alaska Department of Fish and Game reported pesticide use only for State hatchery programs. Again, this use is discussed elsewhere in the report.

The State Department of Corrections did have some pesticide use, primarily for insect and vegetation control associated with indoor and outdoor gardening activities. The total acreage covered by the pesticides used was approximately 26 acres, with 20 of these in potato production. The pesticides are purchased locally.

There was some pesticide use by the Forest Service nursery in Petersburg, the USDA Plant Materials Center in Palmer, and the University of Alaska greenhouse in Fairbanks. These uses are not experimental in nature. While there was a broad range of pesticides used by this group, the total quantities of substances applied was very small. The majority of pesticides used by this group are included in the accompanying printout, but in some instances the quantities are so small that they are not specified. These are primarily substances used at the University greenhouse and include Milban, Karathane, Pentac, Resmethrin, Pictram, Benlate, Piperon, Truban, Orthene, and triforine. Small quantities of pesticides were also used on University horticultural crops. These include Premerge, Temeran, Lorox, Caparol, Atrizene, Treflan, Roundup, Triboul, Ventilate, Ronalan, and Lorsban.

User Groups

Private Pesticide Uses

When dealing with Alaskan private pesticide use on a general level, the State can be divided into two regions: Southeast, and Southcentral/Northern areas. Furthermore, the Southcentral/Northern areas should be separated into urban and bush (rural) areas. In all of these categories there are both striking similarities and differences with regard to pesticides needs and uses.

Probably the most common pest throughout Alaska is the mosquito. With 233 million acres of wetland area in the State, the potential problem is obvious. However, the manner in which people and communities deal with mosquitoes varies significantly. By far the most common treatment is personal use of pesticides. Very few areas attempt to deal with this problem on a community wide basis, with either aerial or land based treatment. Those that do are discussed elsewhere in this report along with the quantity of pesticide applied.

Because of Alaska's climate, the broad spectrum of insect pests that exist in the contiguous United States and Hawaii are not found here. But there are some specific problems that do affect large areas of the State.

There are 13 USDA Extension Service offices in the State of Alaska. Agents in each of these offices were contacted in person or by telephone. Household pests do not appear to be a major problem in the State of Alaska. However, the area of the State which has the most insect problems is Southeast Alaska, where termites and ants are more prevalent. Chlordane is the pesticide used for these problems.

The most ubiquitous garden pest in the State is the root maggot. Diazanon is the chemical of choice for treatment almost without exception. However, some agents report a trend towards the use of Lorsban. Aphids are also a very prevalent problem in Southcentral Alaska. Malathion and Cygon 2E are very commonly used to treat these pests. When spraying is conducted for the control of mosquitoes, malathion and pyrethrin are the two substances used on a large scale basis. Southeast Alaska has additional problems with slugs, fungus, moss and various blights. Due to the dry climate these problems are not as prevalent elsewhere in the State. Slugs appear to be treated primarily with Deadline. Moss is treated with copper sulfate products, and fungus and mold primarily with Maneb and Zineb.

Weeds are a significant problem in Alaska, as elsewhere in the U.S. What appears to make Alaska's problems unique in this regard is the reported ineffectiveness of herbicides in the colder climate. Reaction to this by the extension agents is varied. Some affirm that decreased effectiveness of the herbicides is due to colder soils. It was noted that the optimal soil temperature for herbicide effectiveness is 70 degrees F, and Alaska weed problems emerge when the soils are 10 to 20 degrees lower than this. Other factors may be pH and soil organic level differences. Poctol was noted for possible use on soils of 40-50 degrees F. Other agents suggest that this decreased effectiveness may be due to inappropriate and/or poor application timing. Currently, there are arguments that could support each position; unfortunately, no firm data is available either way. Regardless, this claim of ineffective herbicides often precipitates abuse of pesticides by homeowners changing the quantities and timing of applications. Agents indicated that abuse of pesticides by homeowners is one of their major concerns. There generally appeared to be a lot of faith in the abilities of the larger farms and pest control operators, although it was acknowledged that abuses also occur in this group. All agents report that home gardening is on the rise in their areas, which gives additional weight to the above mentioned concerns regarding individual gardeners. Historically, 2,4-D has been the most commonly used herbicide. The trend now, however, is for increased use of glyphosate (Roundup) by a large and versatile segment of the population.

There were several common concerns among the Extension agents. Many agents felt that additional general pesticide information, pesticide use, and equipment calibration training should be ongoing throughout the State. Agents in the agriculture community were especially concerned about poor equipment calibration and subsequent misapplication of pesticides. It was noted that in many instances there

are blocked nozzles and no agitation. Other concerns were the use of Canadian labeled products in Alaska, such as Vita Vax, or the following of a Canadian label rather than the U.S. label, such as with Cygon 2E. This issue is dealt with elsewhere in this report. There is also not an extension service or University entomologist in the State, which is considered a major void by many individuals.

The most common wood preservative used by the homeowner is pentachlorophenol. There are no wood treatment facilities in the State. As such, construction lumber, etc. is either treated in the lower 48 states prior to purchase or treated by the user in Alaska. Creosote is used to a lesser degree for treatment of pilings, docks, and animal pens. There was no reported use of inorganic arsenicals. One individual with horses estimates he uses 10 gallons of creosote per year for maintenance purposes on barns, fences, etc. He stated that he knew of at least 100 other individuals who had similar uses.

To deal with pesticide poisoning problems, an extension agent in Southeast Alaska has developed an information packet describing proper pesticide application techniques and cleaning practices. Emphasis is placed on the laundering of clothing in the home environment.

User Groups

Experimental Use

Experimental use of pesticides in Alaska appears to be a growing activity within the State. Primarily, this research is being done by the universities through various programs and by State or Federal agencies. Additionally, private groups or corporations are involved in some State research projects.

Actual pesticide quantities used in experimental projects in the State for the 1984 calendar year are provided in this report. However, this discussion will address experimental use before and after 1984 and research projects in an attempt to more accurately define and illustrate trends and activities within the State.

The IR-4, or InterRegional Research Program, has been extensively used in Alaska as a source of funding in the weed control area. Major experimentation has already been completed in an attempt to develop adequate weed control techniques for barley and rapeseed crops. Publications entitled "Postmergence Broadleaf Weed Control in Barley" and "An Evaluation of Herbicides for Broadleaf Weed Control in Rapeseed" are currently available through the University of Alaska. (Research for these studies was conducted 1981-1983 and 1978-1982, respectively).

The IR-4 program is administered by Jeffrey Conn, State Liaison with the University of Alaska-Fairbanks agricultural experiment station. The thrust of the IR-4 program is to conduct research to gain information on toxicology, efficacy, and other areas required by EPA to establish tolerance limits and register a product. The IR-4 program basically provides subsidized registration on a national

level for minor crops because the costs of registration are too large for the chemical manufacturer given the limited market for the pesticide. The IR-4 program is jointly funded by EPA, FDA, SEA-CSRS and USDA ARS and ARS.

To date, the IR-4 program in Alaska has concentrated on herbicides, with one exception. The major IR-4 sponsored research programs initiated in Alaska, with the goal of product registration, include the use of Treflan for weed control in rapeseed, and the use of Warbex/Ivarmectin for insect control in commercial reindeer herds. The Ivarmectin has been registered, but the Treflan has not. There is a frustration on the part of Alaskan researchers that the United States prohibits the use of Canadian data in the United States registration process. In fact, much of the Canadian data is considered more applicable to the Alaskan climate than the information generated in the lower 48 states. Concern was expressed that the United States pesticide industry does not understand Alaskan pesticide needs and is apprehensive of Alaskan users.

There have been research projects started under the IR-4 program which were later assumed by the chemical manufactures. An example of this is the use of Kerb for foxtail barley control. It is the number one weed in pastures and hayland in Alaska and is also a problem in Montana and Wyoming. Because of the potential for a commercial market for Kerb beyond Alaska, the manufacturer has now taken over the registration process.

The University weed science program also provides for herbicide screening to determine the most effective pesticides for Alaska which can be used in accordance with the existing labels.

The Cooperative Extension Service, also a part of USDA, has the role of disseminating information, generally completed by other research entities, to the public. However, on occasion, the Extension Service may become involved in small research projects, which are generally orchestrated by the local extension agent. For instance, in 1985 one extension agent participated in a small herbicide weed control project in Palmer, in response to complaints by farmers that herbicides, when used in accordance with the manufactures label, are not effective in Alaska.

U.S. Forest Service - State and Private Forestry

The USFS conducted one experimental project involving pesticides during 1984. Monosodium Methane Arsenate (MSMA), marketed under the trade name Glowon by Laters Chemical Ltd. of Canada, was used as a toxicant in a lethal trap tree test. This substance is registered in the U.S. but not for use on Bark Beetle, the target pest in this instance. The material was applied with a squeeze bottle to twenty trees over a 2-5 acre area. Approximately 100 grams of active ingredient was used on this project. During 1985 the

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project will be expanded to determine if lethal traps can be effectively used to reduce beetle populations.

The Forest Service appears to be fairly active in pesticide research, initiating projects on an annual basis. The primary intent of this research is to obtain data concerning efficacy and timing for distribution to potential users. In 1983 Bacillus thuringiensis (BT) was tested for its effectiveness in controlling large aspen tortrix. Lindane and Sevin were also tested and compared for their effectiveness in preventing spruce beetle attacks on white spruce. The use of 2% Sevin is being tested as a replacement to Lindane. The Forest Service expects that use of Sevin will protect trees for two years and is not as persistent as Lindane.

Three other experimental projects are slated for the 1985 season. Orthene and Pydrine will be tested as protective sprays for preventing the spruce bud midge from infesting white spruce terminals. Additionally, Orthene, Sevin and two formulations of Bacillus will be used to determine effectiveness in controlling a two year budworm. Lastly, glyphosate will be applied on 1/20 acre plots to determine efficacy and timing in Alaska. Three locations will be treated to determine effectiveness on grasses, Salmonberry and Alder during mid-summer and fall applications. During the next five years, it is anticipated that coordinated research efforts between the Forest Pest Management Staff Group and the Forest Insect Research Group at Fairbanks will undertake more joint research studies which will be expanded into field tests. The Forest Service reports that generally no more than 1 pound of active ingredient, or in rare instances 2-5 gallons of concentrate, will be used per project.

Other

Occasionally, other agencies also become involved in Alaskan research projects. During the summer of 1985, the Plant Materials Center from Madison, Wisconsin, part of USDA, is planning to conduct a double diffusion treatment study for wood preservation of Alaskan tree species (Sitka Spruce, Hemlock, and White Spruce). A similar study was conducted out of the Palmer research center several years ago. Test chemicals included copper sulfate, sodium arsenate, sodium chromate, and sodium fluoride.

Additionally, in 1985 the U.S. Fish and Wildlife Service will be experimenting with the use of Compound 1080 single lethal dose baits for effectiveness in the eradication of Arctic Fox on Kiska Island in the Aleutian Chain. This activity will receive a Federal permit from EPA.

University System Experimental Farms

The Experimental farm at the University of Alaska-Fairbanks does have some pesticide use. In 1984 Premerge, Buctril, and Avenge were used in an attempt to control wild oats in crops. Sencor is utilized for chickweed control and 2,4-D and Glean were used for control of broadleafs. Glyphosate is being tested for its effectiveness on quack grass.

Herbicides (2,4-D and Enide/Diphenamid) are also being tested on greenhouse cold crops. If the market evolves, there is a potential for large scale use in this area. Uses of insecticides in the University

greenhouse are aimed at control rather than experimentation.

Private Uses

Experimentation to determine the effectiveness of Bacillus thuringiensis has been conducted near Kotzebue for the last three years. The substance, a larvicide, has been applied at different times and temperatures to determine maximum effectiveness.

User Groups

Pesticide Availability In Alaskan Communities

A random review of pesticide products available in Alaskan communities has been completed over the last nine months.

Generally speaking, the range of general classification pesticides available in Alaskan communities is somewhat less than those available in the lower 48. This situation can be attributed to a number of factors including a colder climate, and significant difference in lifestyles. As one might suspect, there is also wide variability between pesticides available in urban versus rural Alaskan communities.

On the whole, rural or bush community pesticide stocks in stores consist primarily of numerous mosquito repellents and devices, fly insecticides and traps, rodent baits and traps, and indoor house plant pesticides. All of these substances are found in the general store. In rare instances, wood preservatives and marine anti-fouling paint were also available. There is little or no landscaping in these rural communities so lawn care product stocks are almost nonexistent. While gardening is on the rise, few pesticides are currently used in this area.

In urban Alaskan areas, the selection of pesticides, and the numbers of stores distributing them increases dramatically. In these stores the inventory is expanded to include more outdoor pesticides for garden and landscaping use. However, even in the urban setting, garden and lawn/landscaping pesticide uses are minimal due to the short growing season and limited species of pests.

ENVIRONMENTAL CONCERNS

Public and Special Interest Group Concerns

Pesticide use in Alaska is surprisingly controversial. Much of the debate between use and non-use over the last several years has centered on the Alaska Railroads (ARR) vegetation control program, tree spraying and associated drift problems in Anchorage, and herbicide use by Golden Valley Electric Association. For the most part, these arguments have been confined to the use of herbicides. Use of insecticides does not seem to generate this same level of concern except with tree spraying in Anchorage, perhaps because the quantities used are much less.

The arguments seem to focus on whether there is a clear need for chemical versus manual vegetation control. A significant portion of the general population, including property owners adjacent to right of ways, and organized environmental groups contend that manual methods of vegetation control are just as cost effective and efficient as chemical methods, and are safer for the environment. While efforts have been made to find the least toxic herbicides for current vegetation control programs, many note that this is only a step in the right direction since there are more effective, non-chemical methods of vegetation control available. Proponents of pesticide use argue that manual methods are not as cost effective, do not work as well, are often more dangerous to the workers, and are not warranted, considering the numerous safe herbicides on the market. Additionally, the concern is expressed that State agencies, having been prohibited from using herbicides for several years, are getting far behind in their vegetation control programs and can no longer afford manual vegetation control methods with shrinking State budgets, thus leaving pesticides as the only viable option.

Concerns have been expressed from many different sources that not enough is known about the behavior and persistence of herbicides in the colder, northern climates. Many individuals have expressed frustration that Canadian pesticide registration data is not accepted for registration purposes in the U.S.. Many users feel that Canadian pesticide products are of more value than those registered for use in the U.S. in instances where the U.S. product registration data was generated under climate conditions of the lower 48 states.

In addition to concern that applicators of restricted use pesticides are not adequately trained, there is also concern that such applicators are not adequately supervised. Of perhaps even more concern is the lack of a formal certification process for the commercial use of non-restricted use pesticides, and the almost non-existent enforcement in this area. Many of those surveyed recommended increased enforcement activities to encompass use as well as misuse investigations and changes in the State law to require that all commercial applicators be certified. It was also recommended that applicators of restricted use pesticides be required to be both certified and on site during the pesticide application.

The Alaskan public has also echoed concerns which have been expressed on a national level, pertaining to the entire pesticide registration process. The small number of pesticides which have gone through reregistration, generation of registration data by private corporations, and testing procedures have all been questioned by individuals in the course of data collection for this profile.

The public also expressed concern regarding groundwater contamination by pesticides, especially since the use of root injection or soil drenching techniques may be on the rise.

Pesticide Disposal

In the State of Alaska there do not appear to be any consistent or standard procedures for disposal of empty pesticide containers or excess, illegal or unwanted pesticides. There are a number of possible explanations for this which, realistically, all contribute to the existing situation. Lack of adequate disposal sites for unwanted pesticides is a major contributing factor. Locating and maintaining secure, waste landfills in Alaska is a difficult problem due to high water tables and little or no topsoil. Costs of shipping wastes to approved disposal sites in the lower 48 states are considered prohibitive for many, especially small, users. These all contribute to illegal or improper disposal practices. Additionally, lack of awareness or education regarding proper disposal methods on the part of even certified pesticide users is a problem.

Eighty-three applicators responded to the portion of the survey about disposal practices. Of these, over half reported that they rinse or triple rinse pesticide containers prior to disposal. Over half also reported that they utilized the local dump or landfill to dispose of these empty containers. A large percentage of this group also reported puncturing or crushing containers prior to disposal.

Based on the above information, disposal of empty containers is generally handled appropriately in the State. However, it should be noted that many small communities have no approved landfill available to them. In this instance the pesticide user is faced with no ideal disposal options, and must determine the best disposal option considering the situation.

Disposal of excess mixed pesticides, tank rinse water, or illegal pesticides are probably the most significant disposal issues in the State. Responses from applicators did not indicate any consistent way of dealing with this issue. Eleven of the responses described inappropriate or highly questionable disposal practices including watering of roadways for dust control, spraying in undeveloped areas, and discharge into local sewer systems and private landfills. These inappropriate disposal practices occur at the private and commercial user levels. Government, utility companies and other related interests did not indicate the same lack of proper disposal practices. However, one agency reports disposing of excess mixed pesticides by digging trenches in selected remote areas and refilling the trench after disposal is complete. Other applicators

did report using excess rinse water on the target area or holding rinse water for use in mixing the next day. Only one applicator reported having a washing pad for equipment with an appropriate water collection system. This was a government user.

Ten of the respondents reported using the annual Hazardous Waste Cleanup week (sponsored by ADEC and local municipalities) as the means of disposing of unwanted excess pesticides. Drop off sites are maintained in Juneau, Anchorage and Fairbanks for the disposal of small quantities of hazardous wastes, including pesticides. The program has been operating since 1983, and is growing steadily. Wastes such as chlordane, dieldrin, arsenic acids, DDT, malathion, paraldehyde and 2,4-D have been turned in by private and government users. However, larger generators may not use this service if they have more pesticides than can be accepted. In this situation, it appears these wastes are kept in storage at the facilities indefinately. The potential quantity of pesticide waste for urban areas such as Anchorage could be quite high. In Seattle, the City estimates 4 pounds of waste per household. In Sacramento, this value is 11 pounds. Based on these figures, Anchorage could generate from 39,000 to 107,000 pounds of pesticide waste annually.

The military, a large pesticide user in the State, has its own property disposal system to deal with hazardous wastes, including pesticides. These wastes ultimately find their way to approved sites in the contiguous United States. The Federal Aviation Administration has also encountered caches of DDT throughout the State from past runway construction activities. These wastes have been, or will be, shipped out of the State.

Environmental Monitoring

Environmental monitoring for pesticide residues and contamination in Alaska has historically been a relatively small program. By far, the bulk of monitoring that has been conducted has been done by the U.S. Fish and Wildlife Service (USFWS) under both national and local monitoring programs. This section is intended to be a summary of monitoring which has been completed in Alaska to date, or is currently planned. This section does not include experimental uses of pesticides.

Under the National Pesticide Monitoring Plan, fish tissue analyses have been routinely conducted on species from both the Chena River, near Fairbanks and the Kenai River, near Soldotna (National Trend Analysis Data). The analysis were conducted for organochlorine residues. This data is available from 1969-1978 and 1982. It is anticipated that additional samples will be collected during the upcoming year. Results of this study show that relatively low concentrations of DDT and its metabolites were present. Other substances were for the most part nonexistent, with the exception of toxophene, which was identified in several of the Kenai River fish.

Other sampling projects USFWS has been involved in include fish tissue analysis from Wasilla Lake and the Delta Clearwater River and Lake

System for Dinoseb, Banvel and 2,4-D in 1977. This sampling program was expanded in 1978 to include Badger Slough, a tributary to the Chena River near Fairbanks, and Cabin Lake. Resident birds from the Delta agricultural area were also collected for analysis. On an ongoing basis, contaminant analysis has been performed on dead bald eagles.

Since 1969, USFWS has sampled for DDT in Peregrine Falcon populations on several interior Alaska river drainages on a sporadic basis. Beginning in 1981 a program was established for continued monitoring of this species on the Yukon and Colville Rivers. In 1980 a small sample of wild Bison in the Delta agriculture area were analyzed for agricultural pesticides. Additional sampling of fish and wildlife in the Delta area was conducted in 1982. Of these, only the longnose Sucker showed any detectable levels of organochlorines.

In the case of the Delta agricultural project, other agencies have also been involved in the ongoing monitoring programs. A cooperative monitoring study has been organized between the Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, and U.S. Fish and Wildlife Service to determine possible runoff effects of pesticides into the Delta Clearwater drainage. Sampling efforts were completed in 1983 and 1984.

Additional studies conducted in 1982 by U.S. Fish and Wildlife Service include analysis for toxophene and other organochlorines from Peterson Creek in Juneau. Peterson Lake was treated with toxophene in 1967 by ADF&G for fish removal. A walrus contaminant program was initiated in 1982. Walrus blubber from various native villages was analyzed for fourteen organochlorines, including ten pesticides. Two pesticides, DDT and dieldrin, were reported present.

The extent of other research and monitoring pertaining to pesticides in Alaska is relatively small and appears to be centered primarily around agricultural uses of pesticides. In 1981 the University of Alaska publication, Agroborealis, printed a piece entitled "Persistence and Movement of Agricultural Chemicals in Soils in the Delta-Clearwater area." Both 2,4-D and Treflan were addressed in this report. Also in 1981, the results of a small scale study on "The Persistence of the Herbicides 2,4-D and Picloram in Alaskan Soils North of Latitude 60°" was published in Agroborealis. Other than the reports generated from the experimental use of pesticides discussed elsewhere in this document, these studies appear to be the extent of monitoring completed in the State of Alaska.

Many of the above mentioned monitoring programs are ongoing. In addition, in 1985 the Environmental Protection Agency conducted groundwater monitoring for pesticides at eight sites in Alaska. Sampling locations were selected in Palmer and Wasilla in primarily agricultural areas. One sample was also collected near a landfill and one near the Alaska Railroad right of way.

Lastly, during 1985 the Alaska Health Project conducted a literature search and completed the Alaska Hazardous Materials Incidents Survey. This document covers the period of July 1, 1983 to June 30, 1984.

Findings indicated only one pesticide incident out of 1330 incidents reported. However, some sources of pesticide incident information, such as ADEC, were not utilized. Details of these studies can be obtained through the responsible agency.

Improper Pesticide Use

While conducting the survey and compiling this report, several incidents of pesticide misuse have been revealed.

One of the most blatant pesticide misapplications is an ongoing problem which occurs primarily in the Anchorage area. Aphids are a major insect pest on residential birch trees. Spraying with malathion, Isotox or Metasystox has traditionally been the method of treatment for these pests. However, as individual property owners have become more educated regarding pesticide use and more sensitive to the problems of drift, there has been a large scale move to identify other treatment methods. One method which appears to be very popular is to paint the concentrated form of Cygon 2E onto the tree trunk. Unfortunately, this substance is not registered for this use in the United States, although this is a legal application in Canada. A large commercial greenhouse in the Anchorage area has reportedly been verbally recommending the use of the Canadian application for several years. On visiting this greenhouse in August, a sign (which was removed at our insistence) was found hung above the Cygon 2E which provided directions for use under the Canadian label. Additionally, this method was described in a garden column in the local newspaper.

As noted earlier, the farmers in the Delta Agricultural area are close to Canada, and often purchase goods via this route. Reportedly, farmers have purchased a Canadian seed treatment product marketed as Vita Vax. One commercial shipment of Vita Vax was retained by U.S. Customs and ultimately shipped back to Canada. However, shipments in private vehicles (i.e., pickup trucks) would be more likely to pass customs unnoticed. The concerns with regard to importation of Canadian-labeled pesticides go beyond the illegality of this activity. Because the substances in question are not registered for use in the United States, there are no records on file which disclose potential health effects and environmental harm, essential if an accident or misapplication occurs. Consequently, recommended treatment or clean-up procedures would not be readily avaialable.

In 1984 there were several reported instances of pesticide misapplication associated with commercial activities. These included the apparent fatal pesticide poisoning of a dog from a rodenticide, reports of illness from excessive drift associated with tree spraying, and an apparent illnesses due to room fogging and indoor pesticide

application for control of plant pests. In the previous year there was an incident involving the spraying of penta which resulted in apparent pesticide poisoning symptoms by several Lower Kuskokwim School District employees.

According to Extension Service Agents and other individuals closely involved with private pesticide users, there is a lot of misuse in commercial pesticide use. Individuals may operate under the philosophy that if a little is good, more is better, which results in overapplication. A second problem is poor timing of the application which results in ineffective treatment of the target pest and, again, increased pesticide use.

Another prevalent misuse occurs in bush communities in Alaska where mosquitoes are a major pest. Residents burn "mosquito coils" almost constantly indoors in closed environments. The label directions on these substances specifically prohibit indoor use in restaurants and other enclosed areas. Public Health Service personnel are concerned with potential health effects resulting from this activity, and yet there is no apparent way of stopping this use in these remote locations.

Identified Pesticide User Needs

Individuals expressed a need for more accessible and understandable pesticide information. Some have asked for access to and explanations of EPA registration data and information on the process by which registration decisions are made at the Federal level.

Users of herbicides want cold climate research conducted to identify effective herbicides for use in Alaska. In addition, application rates and timing need to be described for Alaskan conditions.

Foresters, utility companies, and road maintenance personnel want the ability to utilize herbicides in situations where they judge other methods to be unsuitable. The contention is that current methods, or lack of control altogether, which is brought on by the no herbicide policies, costs the State and its residents significant sums of money and cannot continue. In situations where there is downed or dying timber, the threat of Bark Beetle infestation is very real, and historical control techniques are not always effective. Research to identify alternate methods of dealing with this problem, such as use of MSMA in lethal trap trees or pheromone traps, must continue.

Applicators, extension agents, government employees and private citizens have all expressed a need for additional and ongoing pesticide training. This request was reflected in responses to letters, telephone calls and private conversations. Longer and more structured training courses, hands-on training experiences, better learning aids, and increased dissemination of information were all requested.

Extension Agents and other individuals indicated that farmers should be provided additional training in pesticide application practices.

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